INTRODUCTION TO
DEFENSE ACQUISITION MANAGEMENT

EXECUTIVE BRANCH
LEGISLATIVE BRANCH
INDUSTRY
REVOLUTION IN MILITARY AFFAIRS
REVOLUTION IN BUSINESS AFFAIRS
ACQUISITION REFORM
ACQUISITION POLICY
ACQUISITION CATEGORIES
ACQUISITION MANAGEMENT
REQUIREMENTS GENERATION

JANUARY 2001

REPORT DOCUMENTATION PAGE	*Form Approved* *OMB No. 0704-0188*

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.
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1. REPORT DATE *(DD-MM-YYYY)* 01/01	2. REPORT TYPE Technical	3. DATES COVERED *(From - To)*

4. TITLE AND SUBTITLE Introduction to Defense Acquisition Management Fifth Edition	5a. CONTRACT NUMBER
	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S) Mr. C.B. Cochrane Mr. G.J. Hagan	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Defense Acquisition University 9820 Belvoir Rd Ste 3, Attn: FD-AP Ft. Belvoir, VA 22060-5565	8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Defense Acquisition University 9820 Belvoir Rd Ste # Ft. Belvoir, VA 22060-5565	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
"A" Distribution for Public Release; Distribution Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT
This handbook is the fifth edition published by the Defense Acquisition University. Although the general format of the second edition has been retained, this version has been signigicantly revised to reflect the latest (October 2000) acquisition management policies and procedures, the Department of Defense (DoD) 5000 Documents. This handbook is designed to be a quick study guide to refresh the skilled and experienced acquisition management professional; as well as a comprehensive introduction to the world of systems acquisition management for the newcomer. It focuses on Department of Defense-wide applications rather than on the details of how specific weapons (or Automated Information Systems (AIS)) programs are managed.

15. SUBJECT TERMS
Introduction to Defense Acquisition Management, Acquisition Reform, DoD acquisition Policy, Defense Acquisition Management Organizations, Acquisition Management (Life Cycle) Process

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Mr. Greg Caruth
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER *(Include area code)*
Unclassified	Unclassified	Unclassified		78	(703) 805-3364

Standard Form 298 (Rev. 8/98)
Prescribed by ANSI Std. Z39.18

INTRODUCTION TO DEFENSE ACQUISITION MANAGEMENT

FIFTH EDITION

JANUARY 5, 2001

PUBLISHED BY THE
DEFENSE ACQUISITION UNIVERSITY PRESS
FORT BELVOIR, VIRGINIA

PREFACE

This fifth edition of *Introduction to Defense Acquisition Management* provides an update of the regulatory framework in the 23 October 2000 versions of Department of Defense Directive 5000.1 and Department of Defense Instruction 5000.2, governing the Defense acquisition system. Commentary is provided on emerging trends and initiatives such as the Revolution in Military Affairs, the Revolution in Business Affairs, the reduction of Total Ownership Cost of systems, use of commercial products and commercial business practices, evolutionary acquisition strategies, open systems acquisition, program protection, interoperability and others.

This pamphlet is designed to be both a comprehensive introduction to the world of Defense systems acquisition management for the newcomer, and a refresher for the practitioner who has been away from the business for a few years. It focuses on Department of Defense-wide management policies and procedures, not on the details of any specific Defense system.

This pamphlet is based on numerous source documents. For the reader who wishes to dig deeper into this complex area, a list of worldwide web internet sites is provided after the last chapter.

Every attempt has been made to minimize acronyms. Commonly used terms are spelled out first time used in each chapter. More difficult, or rarely used terms, are spelled out each time for ease of reading.

We encourage your suggestions and comments. A postage-paid Customer Feedback form is provided at the back of this pamphlet for your convenience. Please take a few minutes to fill it out and help us improve our publication.

C. B. Cochrane	G. J. Hagan
Chair	*Editor*
Acquisition Policy Department	Acquisition Policy Department

ACKNOWLEDGMENTS

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Chapter 6

1

BASICS

A basic understanding of the Department of Defense (DoD)
acquisition system begins with the following overview:

> *The DoD acquisition system exists to secure and sustain
> the nation's investments in technologies, programs, and
> product support necessary to achieve the National Secu-
> rity Strategy and support the United States Armed Forces.
> The Department's investment strategy must be postured to
> support not only today's force, but also the next force, and
> future forces beyond that. The primary objective of De-
> fense acquisition is to acquire quality products that sat-
> isfy user needs with measurable improvements to mission
> accomplishment and operational support, in a timely man-
> ner, and at a fair and reasonable price. (DoD Directive
> 5000.1)*

Acquisition includes design, engineering, test and evaluation, pro-
duction, and operations and support of Defense systems. As used
herein, the term "Defense acquisition" generally applies only to weap-
ons and information technology systems processes, procedures, and
end products. The word *procurement*, which is the act of buying goods
and services for the Government, is often (and mistakenly) consid-
ered synonymous with acquisition; it is instead but one of the many
functions performed as part of the acquisition process. For example,
non-weapon and non-information technology items required by the
DoD, such as passenger vehicles, office supplies, and waste removal
are "procured," but are not subject to the full range of functions
inherent in the acquisition process of weapons and information
technology systems, and thus are not described in this pamphlet.

Acquisition Programs are directed and funded efforts designed to provide a new, improved, or continuing materiel[1], weapon or information system capability or service in response to a validated operational or business need.

A *weapon system* is an item that can be used directly by the armed forces to carry out combat missions.

Information Technology systems include both *National Security Systems* and *Automated Information Systems*. National security systems are used for intelligence and cryptologic activities and command and control of military forces, or are integral to a weapons system, or critical to the direct fulfillment of a military or intelligence mission. Automated information systems are usually associated with the performance of routine administrative and business tasks such as payroll and accounting functions.

Management includes a set of tasks required to accomplish a specified project. One way of looking at systems acquisition management is by looking at individual elements that comprise each of these terms as noted below:

System	Acquisition	Management

• Hardware
• Software
• Logistic Support
  – Manuals
  – Facilities
  – Personnel
  – Training
  – Spares
	• Design and develop system
	• Test
	• Produce
	• Field
	• Support
	• Improve or replace
	• Dispose of
		• Plan
		• Organize
		• Staff
		• Control
		• Lead

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[1] *Materiel* is a generic word for equipment. It is inherently plural. It is distinguished from *material* which is of what things are made. Material can be singular or plural. For example, aircraft are materiel; the materials aircraft are made out of include aluminum, steel and glass. Materiel acquisition in the Department of Defense is the acquiring of weapons and other military equipment.

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The *program manager* is the individual within the DoD chartered to manage an acquisition program. The program manager has no other command or staff responsibilities. Chapter 2 provides more insight on program management in Defense acquisition.

The Role of Congress, The Executive Branch, and Industry in Defense Acquisition

At the national level, three major top-level participants in Defense acquisition include the Executive Branch, the Congress, and Defense industry. The perspectives, responsibilities, and objectives of these participants is summarized below.

Executive Branch

Major participants with major impact on Defense acquisition programs within the Executive Branch include the President, the Office of Management and Budget, the National Security Council, and the Department of Defense. Chapter 5 contains a more detailed discussion of organizations and positions below this top-level.

Perspectives	Responsibilities	Objectives
• Formulate, direct & execute national security policy • Patriotism • Personal ambition • Re-election	• Sign legislation into law (President) • Commander-in-Chief (President) • Negotiate with Congress • Make decisions on major Defense acquisition programs (the Under Secretary of Defense for Acquisition, Technology and Logistics) • Issue directives/ regulations • Contract with industry	• Satisfy national security objectives • Maintain a balanced force structure • Field weapon systems to defeat threats to national security • Prevent undue congressional interest/ scrutiny • Eliminate fraud, waste, and abuse in federal procurement

Legislative Branch

The Legislative Branch (Congress) includes the two committees that authorize Defense programs, the Senate Armed Services Committee and the House Armed Services Committee; the two committees that appropriate dollars for Defense programs, the House Appropriations Committee and Senate Appropriations Committee; the two committees that set spending limits for national defense, the Senate and House Budget Committees; various committees having legislative oversight of Defense activities; individual members of Congress; the Congressional Budget Office; and the General Accounting Office.

Perspectives	Responsibilities	Objectives
• Constituent interests • Two-party system • Checks and balances • Patriotism • Personal ambition • Re-election	• Conduct hearings • Raise revenue; allocate funds • Pass legislation • Oversight and review	• Balance national security and social needs • Distribute federal dollars by district/state • Maximize competition • Control industry profits • Control fraud, waste, and abuse

Defense Industry

Industry (contractors) includes large and small organizations (both U.S. and foreign) providing goods and services to the DoD (see chart on page 5).

Numerous external factors impact on and help shape every acquisition program, creating an environment over which no single person has complete control. These factors include policies, decisions, reactions, emergencies, the media, public sentiment and emotions, world opinion, and the ever present (and changing) threats to national

Perspectives	Responsibilities	Objectives
• Stockholders interests • Capitalism • Patriotism	• Respond to solicitations • Propose solutions • Conduct independent Research and Development • Design, produce, support, and upgrade Defense systems	• Profit and growth • Cash flow • Market share • Stability • Technological achievement

security. Often these factors work at opposite purposes. Understanding and dealing with the environment they create is one of the greatest challenges for Defense program managers. Figure 1-1 illustrates some of the interrelationships among these key players. This figure also shows the program manager in the middle of a complex triangle of relationships, faced with the challenge of managing a Defense acquisition program in the midst of many significant, diverse, and often competing interests.
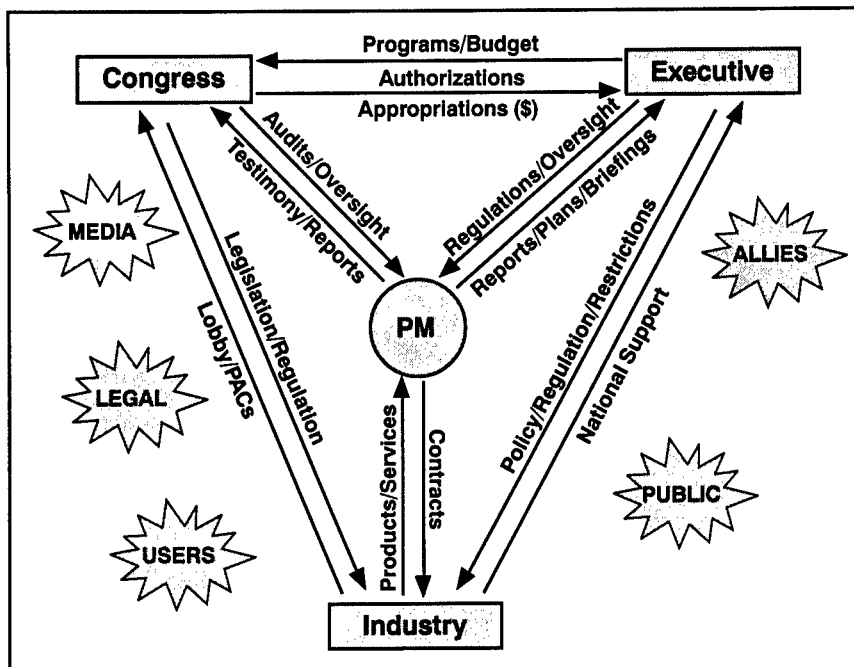
Figure 1-1. The Program Manager's Environment

Successful Defense Acquisition Program

A successful Defense acquisition program is one that places a capable and supportable system in the hands of a user (the warfighter, or those that support the warfighter) when and where it is needed, and does so at an affordable price. The ideal outcome necessary for successful long-term relationships among the participants in Defense acquisition is "Win-Win," wherein each participant gains something of value for participating. Depending on your perspective, "success" can take many different forms.

- For the *Program Manager*, success means a system that is delivered on time, within cost, and meets the warfighter's requirements.

- For the *Office of the Secretary of Defense*, success means a program that satisfies national security objectives, provides a balanced force structure, and does not attract undue Congressional scrutiny.

- For the *Congress*, success means a system that strikes a balance between Defense and social needs, and provides a fair distribution of Defense dollars by state/district.

- For *industry*, success means a program that provides a positive cash flow, a satisfactory return on investment, and preserves the contractor's competitive position in the industry.

- For the *warfighter*, success means a system that is effective in combat and easy to operate and maintain.

Authority for Defense Acquisition

The authority for DoD to conduct Defense acquisition, i.e., to develop, produce, and field weapons systems, flows from two principal sources: the law (legal basis) and executive direction. Executive direction flows from the authority of the President and the federal government's executive agencies to issue orders and regulations to

both enforce and facilitate the law and to help carry out the constitutional duties of the executive branch.

The Law

Statutory authority from Congress provides the legal basis for systems acquisition. Some of the most prominent laws are:

- Small Business Act (1963), as amended

- Office of Federal Procurement Policy Act (1983), as amended

- Competition in Contracting Act (1984)

- Department of Defense Procurement Reform Act (1985)

- Department of Defense Reorganization Act of 1986 (Goldwater-Nichols)

- Government Performance and Results Act (1993)

- Federal Acquisition Streamlining Act of 1994

- Annual authorization and appropriations legislation, which in recent years have contained substantial new or amended statutory requirements, like the Clinger-Cohen Act of 1996.

Most provisions of the above have been codified in Title 10, United States Code, Armed Forces.

Executive Direction

Authority and guidance also comes from the Executive Branch in the form of executive orders and national security decision directives issued by the President, and other agency regulations. Examples include:

- *Executive Order 12352* **(1982)**. Directed procurement reforms and establishment of the Federal Acquisition Regulation.

- *Federal Acquisition Regulation* **(1984)**. Provided uniform policies and procedures for the procurement of all goods and services by executive agencies of the Federal government. Additional guidance for Defense acquisition programs is provided in the DoD Federal Acquisition Regulation Supplement.

- *National Security Decision Directive 219* **(1986)**. Directed implementation of recommendations of the President's Blue Ribbon Commission on Defense Management.

- *Executive Order 13011* **(1996)**. Implemented the provisions of the Information Technology Management Reform Act.

- *Office of Management and Budget Circular A-11 (1997)*. Describes the process for preparation and submission of budget estimates, strategic plans and annual performance plans, and the planning, budgeting and acquisition of capital assets for all executive departments. Defense weapon systems are capital assets.

The Acquisition Environment

Revolution in Military Affairs

Many Defense analysts believe the conduct of warfare is entering a period of fundamental change, literally, a "revolution in military affairs," driven by advances in information technology and precision guided weapons. Past experience suggests that revolutions in military affairs are not produced solely by rapid technological advancements, but also require changes to prevailing operational concepts, doctrine and force structure to fully harness the technology in a manner to dominate the battlefield. Coupled with the rise of new threats since the end of the Cold War (international drug cartels, terrorism, regional warfare, chemical/biological agents, availability of missile technology, etc.), the United States has begun the process of transforming

its forces to harness the revolution in military affairs both to meet these new threats and to ensure it remains dominant on any 21st Century battlefield.

Revolution in Business Affairs

The revolution in business affairs is intended to fundamentally change DoD's business practices and reengineer its infrastructure in support of the warfighter. This "revolution" encompasses three broad streams of activity: (1) Expanding and fully implementing acquisition reform (see Chapter 3); (2) Working with the General Accounting Office and the Defense Contract Auditing Agency to do away with specialized government auditing and accounting procedures to facilitate civil-military integration and expand the number of companies willing to do business with the DoD; and (3) Dramatically reducing the size and cost of the Defense support infrastructure by applying commercial practices, privatizing and conducting public-private competitions for those support areas that are not of an inherently governmental nature.

Joint Vision 2020

Joint Vision 2020 is the Chairman of the Joint Chiefs of Staff's conceptual blueprint for future military operations. Joint Vision 2020 provides a foundation for broad support of the Revolution in Military Affairs through the creation and exploitation of information superiority. Central to the Chairman's vision is the concept of "full-spectrum dominance," achieved through the interdependent application of four operational concepts: dominant maneuver, precision engagement, focused logistics, and full-dimensional protection. Together, these four concepts provide the joint warfighters the means to fulfill their primary purpose — victory in war, as well as the capability to dominate an opponent across the full-range of military operations. Achieving full spectrum dominance also means building an integrated, complex set of systems, especially a command, control, communications, computers, intelligence, surveillance and reconnaissance architecture (see Chapter 5). The research, development, and

acquisition of future Defense systems to fulfill the Chairman's vision, and the Military Service Chief's companion visions, will be a challenge for the Defense acquisition system outlined herein.

2

PROGRAM MANAGEMENT IN DEFENSE ACQUISITION

Department of Defense (DoD) policy requires that a *program manager* be designated for each acquisition program. The role of the program manager[2] is to direct the development, production, and initial deployment (as a minimum) of a new Defense system. This must be done within limits of cost, schedule, and performance, as approved by the program manager's acquisition executive (see Chapter 5). The program manager's role, then, is to be the agent of the military service or Defense agency in the Defense acquisition system to ensure the warfighter's modernization requirements are met efficiently and effectively in the shortest possible time.

Definition of Program Management

> *The process whereby a single leader exercises centralized authority and responsibility for planning, organizing, staffing, controlling, and leading the combined efforts of participating/assigned civilian and military personnel and organizations, for the management of a specific Defense acquisition program or programs, through development, production, deployment, operations, support, and disposal.*

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[2] The term "program manager" is used broadly here. Some DoD components use different titles. For example, the Army uses "project" and "product" manager depending on the authorized rank of the position.

Program management must first take into account diverse interests and points of view. Second, it facilitates tailoring the management system and techniques to the uniqueness of the program. Third, it represents integration of a complex system of differing but related functional disciplines[3] that must work together to achieve program goals.

Program Manager's Perspective

The effective program manager should have the "big picture" perspective of the program, including in-depth knowledge of the interrelationships among its elements. An effective program manager:

- is a leader and a manager, not primarily a task "doer;"

- understands the requirements, environmental factors, organizations, activities, constraints, risks, and motivations impacting the program;

- knows and is capable of working within the established framework, managerial systems, and processes that provide funding and other decisions for the program to proceed;

- comprehends and puts to use the basic skills of management — planning, organizing, staffing, leading, and controlling — so people and systems harmonize to produce the desired results;

- coordinates the work of Defense industry contractors, consultants, in-house engineers and logisticians, contracting officers, and others, whether assigned directly to the program office or supporting it through some form of integrated product team or matrix support arrangement;

- builds support for the program and monitors reactions and perceptions which help or impede progress; and

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[3] Functional disciplines refer to business and financial management, logistics, systems engineering, software management, test and evaluation, manufacturing management, and others.

- serves both the military needs of the user in the field and the priority and funding constraints imposed by managers in the Pentagon and military service/Defense agency headquarters.

Why is Program Management Used in Defense Acquisition?

Program management provides for a single point of contact, the program manager, who is the major force for directing the system through its evolution, including design, development, production, deployment, operations and support, and disposal. The program manager, while perhaps being unable to control the external environment, has management authority over business and technical aspects of a specific program. The program manager has only one responsibility — managing the program — and accountability is clear. Defense industry typically follows a management process similar to that used by DoD. Often contractors will staff and operate their program office to parallel that of the government program they support.

Integrated Product and Process Development

Integrated product and process development is a management process that integrates all activities from the concept of a new Defense system through the entire life cycle (see Chapter 7), using multidisciplinary teams, called integrated product teams.

The Program Manager and Integrated Product Teams

An integrated product team is composed of representatives from all appropriate functional disciplines working together with a team leader to facilitate management of acquisition programs. Integrated product teams exist at the oversight and review levels (see Chapter 5), as well as teams at the program office level. The program office level integrated product teams may be structured around the major design aspects of the system under development, such as an "engine Integrated Product Team," or processes like a "test Integrated Product Team." Following contract award, program level integrated product teams often include contractor participation.

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The DoD has recognized the importance of integrated product teams as a means to aid the program manager, and as a way to streamline the decision process. By working as part of cross-functional teams, issues can be identified and resolved more quickly, and stakeholder involvement in the overall success of the program maximized. In this way the program manager capitalizes on the strengths of all the stakeholders in the Defense acquisition system.

3

ACQUISITION
REFORM

The Department of Defense (DoD) vision for Acquisition Reform is:

"DoD will be recognized as the world's smartest, most efficient, and most responsive buyer of best-value goods and services that meet our warfighters' needs from a globally competitive national industrial base."[4]

Background

There have been many attempts to reform the federal government procurement process over time. However, in the early 1990s it became clear that the rapidly changing threat environment, reduced resources, and changes in technology development required permanent changes in the way DoD acquired Defense systems.

Perhaps the most notable change in Defense systems acquisition was caused by the collapse of the Soviet Union. This major world event impacted national objectives, treaties, budgets, and alliances. The specter of strategic thermonuclear war lessened while the probability of regional conflicts (Desert Storm) and policing actions (Bosnia) increased. Domestic terrorism, information warfare, and narcotics control are becoming increasingly troublesome threats to national security, and the Department is playing an ever-increasing role in resolving these issues.

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[4] Deputy Under Secretary of Defense (Acquisition Reform)

As budgets were scaled back, decision makers were forced to prioritize. In spite of continuing trouble in hot spots around the world, the collapse of the Soviet Union prompted decreases in the Department's budget and reductions in personnel. Even though budgets in recent years have been more favorable to the Department, it is likely that fewer new acquisition programs will be initiated in the immediate future. In the past, expensive technology-based programs have been considered a key advantage. Lately, there has been an increased emphasis on affordability, mature technology, interoperability of systems, the pursuit of a stronger industrial base, and a reduced role in the development of new technologies and innovations.

The Defense industrial base has gone through a metamorphosis. Weaker competitors have merged with stronger companies, or have dropped out of the market. The remaining large contractors are positioning themselves with other major contractors to compete for remaining Defense contracts. For example, in 1982 there were ten major U.S. producers of fixed-wing military aircraft. By 1998, there were only three: Boeing, Lockheed-Martin, and Northrop Grumman. As a result of this reduced industrial base, the Department is working to bring about greater civilian/military industrial integration.

Foundation for Acquisition Reform

Given the changes in the threat and downward pressure on the budget, DoD could not continue to conduct business as usual. Further, the fast pace of technological advances in the commercial market created a real need for access to this technology before potential adversaries could buy it. Therefore, the Department fundamentally changed the way it acquired systems — that is, more efficient and effective ways to acquire goods and services faster, better, and cheaper. This led to the following major "events" that provided the foundation for acquisition reform within the Department:

- *National Partnership for Reinventing Government.* This White House initiative was started in the mid-1990s to create a government that "works better, costs less, and gets results Americans

care about." DoD was designated a "High Impact Agency" for acquisition reform.

- *Section 800 Panel Report* **(1993)**. This report was the result of Congressional direction to the Under Secretary of Defense (Acquisition, Technology and Logistics) to review all DoD procurement laws "with a view toward streamlining the *Defense* acquisition process." It recommended over 400 changes to existing laws and regulations. The report was intended to not only implement reforms recommended in several previous studies but also provide a framework for continuous improvements in acquisition practices.

- *Secretary of Defense Perry's "Acquisition Reform — A Mandate for Change"* **(February 1994)**. This paper lists the key reasons why change in acquisition is imperative and outlines methods to make the most impact through change. This led to the formal beginning of regulatory reform in DoD.

Long-term emphasis on the need for change was essential to maintain a preeminent military force structure. Many initiatives were implemented to institutionalize new attitudes and effect the necessary changes in cultural behavior. These initiatives were derived from three sources, major legislation, process action teams and regulatory reform:

Major Legislation

- *Federal Acquisition Streamlining Act (FASA)* **(1994)**. Major legislation concerned with procurement reform, which implemented many of the recommendations of the Section 800 Panel Report. FASA repealed or substantially modified over 225 provisions of law primarily dealing with contracting and procurement matters. Notable features of this legislation include emphasis on the use of commercial versus military specifications, encouragement of electronic commerce, and requirements to use past performance when evaluating contractor proposals.

- *The Federal Acquisition Reform Act (FARA)* **(1996)**. A follow-up to FASA, FARA (Division D of the FY 1996 National Defense Authorization Act) covers some of the Section 800 Panel acquisition reform recommendations that were not covered in FASA. Some of the more interesting issues covered include exceptions for commercial item acquisitions, to the Truth in Negotiations Act, and Cost Accounting Standards.

- *Information Technology Management Reform Act (ITMRA)* **(1996)**. ITMRA was enacted as Division E of the FY 1996 National Defense Authorization Act. This act requires greater accountability for system improvements achieved through information technology (IT). Among other things, the act streamlines both protest and acquisition procedures for IT systems by identifying the General Accounting Office as the single agency for protests; and by repealing the Brooks Act, which since the 1960's imposed cumbersome regulations on purchasing computers (originally targeted at mainframes). It also addresses the issue of rapidly changing technology by requiring modular contracting, with increments delivered within 18 months of contract award. **Note:** FARA and ITMRA are know together as the "Clinger-Cohen Act" in honor of their congressional sponsors.

Process Action Teams. In the mid-1990's, the Secretary of Defense established several teams of "practitioners" from the military services and Defense agencies to determine how best to achieve policy changes in electronic commerce/electronic data interchange, military specifications and standards, procurement, contract administration services, oversight and review, and automated acquisition information. Each of these teams published reports that resulted in significant impact on the management of Defense acquisition programs.

Regulatory Reform. Provisions of the Federal Acquisition Streamlining Act, the Clinger-Cohen Act, and recommendations of the various process action teams were implemented in changes to the Federal Acquisition Regulation (and its Defense Supplement), and DoD directives, instructions and regulations for systems acquisition. (The

Federal Acquisition Regulation was mentioned in Chapter 1; regulatory provisions will be covered in Chapter 4).

Offices were established throughout DoD to support acquisition reform efforts, including the Deputy Under Secretary of Defense for Acquisition Reform in the Office of the Secretary of Defense. In addition, designated pilot programs were given statutory and regulatory relief to "test drive" new ideas and processes.

Sustaining Acquisition Reform

To realize the vision of Acquisition Reform, and to sustain the momentum, DoD has taken on the following missions:

- Adapting the best practices of world-class customers and suppliers;

- Continuously improving the acquisition process to ensure it remains flexible, agile, and, to the maximum extent possible, based on best practices;

- Provide incentives for acquisition personnel to innovate and manage risk rather than avoid it; and,

- Taking maximum advantage of emerging technologies that enables business process reengineering and enterprise integration.

Implementing Initiatives for Acquisition Reform

Implementing initiatives support the vision and mission of acquisition reform. These initiatives must interact and work together to support the objectives of acquiring Defense systems better, faster, and cheaper. The following are not all-inclusive, but capture the essence of the major thrusts of acquisition reform within DoD.

Alternative Dispute Resolution. To facilitate resolution of differences between the government and its contractors without going into a formal protest or litigation process, alternative dispute resolution

provides voluntary procedures to resolve issues in controversy. These procedures may include, but are not limited to, conciliation, facilitation, mediation, fact finding, arbitration, and use of ombudsmen.

Advanced Concept Technology Demonstrations. In recognition that there should be opportunities to try out technology directly with the warfighters, advanced concept technology demonstration efforts allow operational forces to experiment with new technology in the field to evaluate potential changes to doctrine, operational concepts, tactics, modernization plans and training. Following a successful advanced concept technology demonstration the system may enter the acquisition process at whatever point good judgment dictates.

Best Value Contracting. DoD seeks to award contracts based on the best overall value. This means that the Department considers all relevant factors, such as cost, performance, quality, and schedule, and makes potential tradeoffs between cost and non-cost factors, rather than just buying from the lowest cost, technically acceptable offeror.

Commercial Items and Practices. Maximizing the use of commercial items takes advantage of the innovation offered by the commercial marketplace and ensures access to the latest technology, and a broader vendor base. DoD is also encouraging Defense contractors to move to commercial practices, which will enhance their global competitiveness. The Department's goal is to establish partnerships with industry to create advanced products and systems with common technological bases, to allow production of low-volume Defense-unique items on the same lines with high-volume commercial items.

Cost as a Military Requirement. Only the warfighter can determine what a new system is worth, compared to other needed capabilities and their costs. The Operational Requirements Document (see Chapter 6) must now contain cost objectives that will allow an affordability determination to be made early in a proposed acquisition program.

Cost As an Independent Variable is used to develop strategies for acquiring and operating affordable systems by setting aggressive, achievable cost objectives and managing achievement of these objectives. Through participation on cost performance integrated product teams, key stakeholders (users, industry, etc.) help set and achieve cost objectives by identifying potential tradeoffs early in the acquisition process.

Integrated Product Teams and Integrated Product and Process Development are two closely intertwined initiatives that are replacing traditionally adversarial relationships among key players (users, acquirers, testers, funds managers, contractors, and other stakeholders) with cooperation and teamwork to improve product quality and supportability.

Logistics Transformation will transform DoD's mass logistics system to a highly agile, reliable system that delivers logistics on demand. Logistics reform will move toward performance based support and link modern warfighting and modern business practice. The commercial marketplace demonstrates that product support can be optimized to create a strategic advantage by focusing on customer service, integrated supply chains, rapid transportation, and electronic commerce. When applied to Defense, this equates to integrated logistics chains focused on readiness and rapid service to the warfighter.

Open Systems. Designing open systems and specifying interface standards enhances interoperability, both among the services and with our Allies. Applying widely used interface standards in weapons systems will enable multiple sources of supply and technology insertion and allow for upgrading through spares.

Past Performance of Contractors. DoD is expanding the collection and use of past performance data to improve the quality of purchased goods and services. Collection of data is being automated and standardized across the Department. Evaluation of past performance is being used as a significant factor during source selections.

Price-Based Acquisition is a way of doing business that results in a firm-fixed-price (or fixed price with performance incentives) contract and a fair and reasonable price without the government obtaining supplier cost data. The implementation of this initiative will require changes to the requirements generation and acquisition processes to allow the use of price-based acquisition for research and development without shifting significant risk to the contractor.

Performance-Based Services Acquisition. As services become an increasingly significant element of what DoD buys, steps are being taken to ensure they are acquired effectively and efficiently. Service requirements must be stated using results required, and not methods for performance of the work.

Simulation Based Acquisition is a process in which the DoD and industry are enabled by robust, collaborative use of simulation technology integrated across acquisition phases and programs. The intent is a dramatically improved acquisition process enhanced by the application of advanced information technology.

Streamlined Procedures. Streamlining internal procedures reduces cycle time and cuts administrative costs. The October 2000, DoD Instruction 5000.2, *Operation of the Defense Acquisition System*, provides a flexible process for rapid acquisition of mature technology, with evolutionary acquisition strategies and time-phased requirements that allow early fielding of a usable warfighting capability, with block upgrades to full capability over time.

Single Process Initiative allows a single process for both commercial and military products. To ensure existing contracts reap the benefits of this initiative, block changes of multiple contracts have been implemented at many facilities. Removing government unique requirements makes it easier and cheaper for contractors to produce military products by using existing commercial processes and production lines.

Specifications and Standards Reform. Secretary of Defense Perry approved new major policy in mid-1994, for use of specifications and standards for Defense systems acquisition contracts. First choice is the use of performance specifications. Design specific specifications and standards are authorized only as a last resort, and their use requires a waiver.

There are many more initiatives in place, as well as new ones being tested throughout the Department. These initiatives will help America acquire quality Defense systems faster, and cheaper — essential if this country is to maintain the world's best warfighting forces. The cultural shifts in the acquisition process may be characterized by the following chart:

Goals of Systems Acquisition in the past included:	Today the emphasis has shifted toward:
• Many new systems	• Fewer new systems; modified legacy systems
• Focus on nuclear warfare	• Conventional warfare
• Technology driven systems	• Affordability driven systems
• Service-specific programs	• Joint programs
• Military-unique technology	• Commercial and dual-use technology
• Technology development	• Technology insertion

4

DEPARTMENT
OF DEFENSE
ACQUISITION POLICY

Three major Department of Defense (DoD) regulatory documents guide the management of Defense acquisition:

DoD Directive 5000.1, *The Defense Acquisition System*, approved by the Deputy Secretary of Defense, describes management principles for all DoD acquisition programs. DoDD 5000.1 provides policies and principles to govern the Defense acquisition system. It applies to all Defense acquisition programs, and is divided into five major areas: 1) Achieving interoperability within and among United States forces and coalition partners, 2) Rapid and effective transition from science and technology to products, 3) Rapid and effective transition from acquisition to deployment and fielding, 4) Integrated and effective operational support, and 5) Effective management.

DoD Instruction 5000.2, *Operation of the Defense Acquisition System*, approved by the Under Secretary (Acquisition, Technology and Logistics) (USD(AT&L)), the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (ASD(C3I)), and the DoD Director, Operational Test and Evaluation (DOT&E), establishes a simplified and flexible management framework for translating mission needs and technological opportunities into stable, affordable, and well-managed acquisition programs. DoDI 5000.2 establishes a general approach for managing all Defense acquisition programs, while recognizing that every technology project and acquisition program is unique and the process described in the
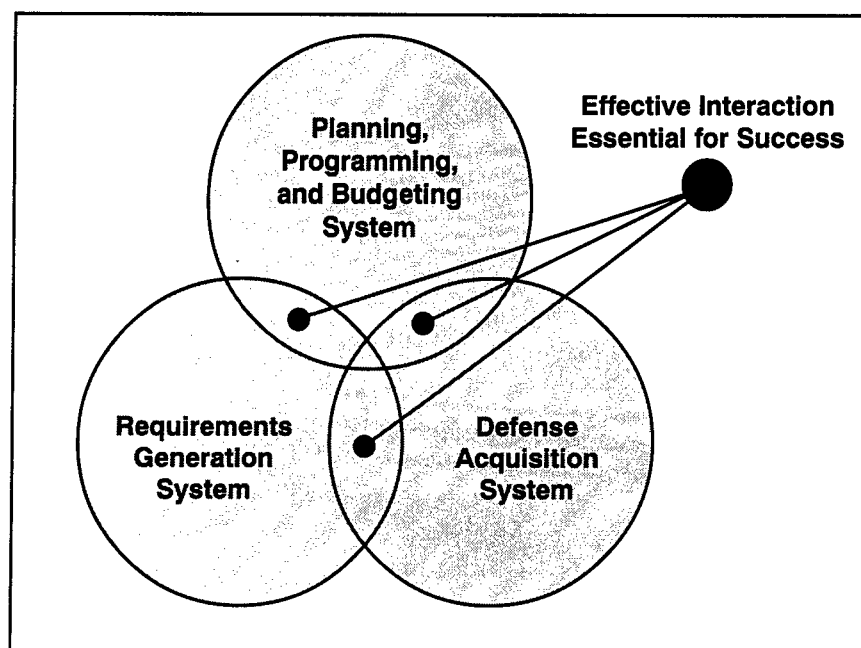
Figure 4-1. Three Major Decision Support Systems

instruction must be tailored to reflect those unique attributes. The instruction provides procedures for operation of the acquisition process based on an *integrated management framework*, formed by three primary decision support systems: the Requirements Generation System, the Defense Acquisition System, and the Planning, Programming, and Budgeting System (PPBS). This integrated management framework is depicted in Figure 4-1.

DoD Regulation 5000.2-R[5], *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, approved by the USD(AT&L), ASD(C3I), and the DoD DOT&E, specifies *mandatory* policies and procedures for major Defense acquisition programs and major automated information systems acquisition programs and,

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[5] As of the date of publication of this pamphlet, DoD Regulation 5000.2-R dated May 1996 had been cancelled by USD(AT&L)/ASD(C3I)/DOT&E memorandum, *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, dated October 23, 2000. A new DoD 5000.2-R will be published in early 2001.

where specifically stated, for other than major programs. Nonmajor programs *generally* follow the same process as major programs, however, the milestone decision authority tailors the process as appropriate (and consistent with statutory requirements) to best match the conditions of individual nonmajor programs.

Three Major Decision Support Systems

These three major decision support systems (Figure 4-1) operate continuously and must interface on a regular basis to enable the leadership to make informed decisions regarding the best allocation of scarce resources. This pamphlet discusses these decision support systems in Chapters 6, 7, and 8, respectively.

The *Requirements Generation System*, governed by Chairman of the Joint Chiefs of Staff Instruction 3170.01A, is the system that results in identifying and documenting warfighting needs, i.e., mission deficiencies or technological opportunities.

The *Defense Acquisition System*, governed by the DoD 5000 series of regulatory documents, establishes a management framework for translating the needs of the warfighter, and technological opportunities, into reliable, affordable, and sustainable systems.

The *Planning, Programming and Budgeting System*, governed by DoD Directive 7045.14, prescribes the process for making decisions on funding for every element of the Department, including acquisition programs.

Acquisition Categories

For management purposes, all Defense acquisition programs can be put into one of the following acquisition categories (ACATs), principally based on their dollar value and milestone decision authority as shown in Figure 4-2. The chain of authority and organizational players affecting various ACATs are discussed in Chapter 5.

Major Defense Acquisition Programs	ACAT ID: • Designated by USD(AT&L) • Defense Acquisition Board Review • Decision by USD(AT&L) ACAT IC: • Designated by USD(AT&L) • Component-level Review • Decision by Component Acquisition Executive	$365M RDT&E or $2.19B Procurement (FY2000 Constant $)
Major Automated Information Systems Acquisition Programs	ACAT IAM: • Designated by ASD(C3I) • Information Technology OIPT Review • Decision by ASD(C3I) ACAT IAC: • Designated by ASD(C3I) • Component-level Review • Decision by Component Chief Information Officer	$378M Life Cycle Cost or $126M Total Prog. Cost or $32M Prog. Cost in any single year (FY2000 Constant $)
Major Systems	ACAT II: • Designated by Component Acquisition Executive • Component-level Review • Decision by Component Acquisition Executive	$140M RDT&E or $660M Procurement (FY2000 Constant $)
All Other Systems (except for Army, Navy, USMC)	ACAT III: • Designated IAW Component Policy • Does not meet criteria for ACAT I, IA or II • Review and decision at lowest appropriate level	No Fiscal Criteria
Army Navy USMC	ACAT IV: • Designated IAW Component Policy • Does not meet criteria for ACAT I, IA, II or III • Review and decision at lowest appropriate level	See AR 70-1 (Army) and SECNAVINST 5000.2B (Navy and Marine Corps)

Figure 4-2. Acquisition Categories

Major Defense acquisition programs are ACAT I programs. There are two subcategories of ACAT I programs:

- *ACAT ID*. The milestone decision authority is the USD(AT&L). The "D" refers to the Defense Acquisition Board. These programs

require a review by an office of the Secretary of Defense Overarching Integrated Product Team and the Defense Acquisition Board. The USD(AT&L) as the Defense Acquisition Executive makes the final decision.

- *ACAT IC*, for which the milestone decision authority is the Component[6] Acquisition Executive (CAE). The "C" refers to Component. Each of the components has its own process for headquarters review of these programs prior to a milestone decision by the Component acquisition executive.

Major automated information system acquisition programs are ACAT IA programs. There are two subcategories of ACAT IA programs:

- *ACAT IAM*, for which the milestone decision authority is the ASD(C3I). The "M" refers to major automated information systems reviewed by the Information Technology Overarching Integrated Product Team. Final decision authority lies with the assistant secretary who is also the Chief Information Officer of the DoD.

- *ACAT IAC*, for which the milestone decision authority is the Component chief information officer. The "C" refers to Component. After the appropriate headquarters review, the Component chief information officer makes the final milestone decision.

ACAT II programs are those programs that do not meet the criteria for an ACAT I program but do meet the criteria for a major system. The milestone decision authority for these programs is also the Component acquisition executive. The review process for these programs is similar to that of ACAT IC programs.

ACAT III programs are those programs that do not meet the criteria for ACAT I, ACAT IA, or ACAT II. The milestone decision authority

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[6] DoD Components are the military departments, defense agencies and unified commands. Only one unified command has an acquisition executive, the U.S. Special Operations Command.

is designated by the Component acquisition executive. Milestone decisions for these programs are typically made at the Program Executive Officer or Systems Command (Navy and Marine Corps), Major Subordinate Command (Army), or Product or Air Logistics Center (Air Force) level. This category also includes nonmajor automated information system acquisition programs.

ACAT IV programs have been retained as a designation for internal use by the Departments of the Army and Navy.

Defense Acquisition Deskbook

In addition to the regulatory documents mentioned above, and throughout this pamphlet, the *Defense Acquisition Deskbook* can be accessed over the internet at http://www.deskbook.osd.mil. *Deskbook* provides a complete reference library for the acquisition community. It is updated regularly, and is also available by mail to government employees free of charge on a Compact Disk. (There is a nominal charge for non-government personnel.)

5

DEFENSE ACQUISITION MANAGEMENT – KEY PERSONNEL AND ORGANIZATIONS

Background

Packard Commission

The President's Blue Ribbon Commission on Defense Management, chaired by former Deputy Secretary of Defense David Packard, conducted a comprehensive review of the overall Defense acquisition system. Reporting to President Reagan in early 1986, the Packard Commission recommended creation of a single top-level Defense Acquisition Executive responsible for the Defense acquisition process, the Under Secretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)), and establishment of a streamlined reporting chain from program managers of major Defense acquisition programs to that top-level executive. President Reagan approved the Commission's recommendations, and directed their implementation in National Security Decision Directive 219 on April 1, 1986.

Defense Management Review

A follow-on assessment of Defense acquisition management was initiated by President Bush in 1989. The report of the Defense Management Review reiterated the Packard Commission findings,

and reinforced the importance of the streamlined reporting chain for all program managers. This reporting chain provides for no more than two levels of management oversight between the program manager and the milestone decision authority for all acquisition programs. The reporting chain for any particular program is a function of the program's size and acquisition category (ACAT). (See Chapter 4 for a discussion of ACATs.)

This structure provides a clear line of authority running from the USD(AT&L), through Component Acquisition Executives and Program Executive Officers, to the individual program managers of ACAT ID programs. For ACAT IAM programs, the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) (ASD(C3I)), as the Department of Defense (DoD) Chief Information Officer, serves as the milestone decision authority.

Program Executive Officers

The position of Program Executive Officer (PEO) was established in 1986 based on the Packard Commission Report. A PEO is typically a one or two star general officer or senior executive service civilian equivalent responsible for the first line supervision of a group of like programs, each managed by a program manager. Examples are the Army's PEO for Tactical Missiles, the Navy's PEO for Tactical Aircraft Programs, and the Air Force's PEO for Fighters and Bombers. The number of PEOs varies by service and over time, but typically, the services have between six and ten program executive officers at any one time.

Acquisition Program Reporting

The reporting structure for ACAT ID and ACAT IAM acquisition programs is illustrated in Figure 5-1.

Component Acquisition Executives

ACAT ID Programs | **Milestone Decision Authority** | **ACAT IAM Programs**

ACAT ID		ACAT IAM
Defense Acquisition Executive USD(AT&L)	Milestone Decision Authority	DoD Chief Information Officer ASD(C3I)
Component Acquisition Executive	Asst Secretary or Equivalent	Chief Information Officer
Program Executive Officer (See note)	General Officer/SES Civilian	Program Executive Officer (See note)
Program Manager	Col/LtCol/Civilian Equivalent	Program Manager

Note: Some PMs do not report through a PEO.

Figure 5-1. DoD Acquisition Authority Chain

The senior official in each DoD Component responsible for acquisition matters is known as the Component Acquisition Executive (CAE). The CAE is the Secretary of the Military Department, or the Head of the Defense Agency, with power of redelegation. In the military departments, the Secretaries have delegated this responsibility to the assistant secretary level, commonly called the *Service Acquisition Executives*, or SAEs. The SAE for the Army is the Assistant Secretary of the Army for Acquisition, Logistics and Technology. The Department of the Navy SAE (includes Marine Corps) is the Assistant Secretary of the Navy for Research, Development, and Acquisition. The SAE for the Air Force is the Assistant Secretary of the Air Force for Acquisition. The SAE reports to the Secretary administratively and to the USD(AT&L) for acquisition management matters. Each SAE also serves as the Senior Procurement Executive for their military department. In this capacity, they are responsible for

management direction of their respective service procurement system. The United States Special Operations Command also has an acquisition executive.

ACAT ID programs destined for review/approval by the USD(AT&L), and other programs reviewed by the components, follow the same basic management oversight process, but the final decision authority is at a lower level for the latter programs. Similarly, ACAT IAM programs destined for review/approval by the ASD(C3I), and automated information system acquisition programs reviewed by the Components follow the same basic management oversight process, but with the final decision authority at the lower level for the latter programs.

Component Chief Information Officers

The DoD Components have set up an oversight and review process for nonmajor automated information systems acquisition programs for which the milestone decision authority may be the Component Chief Information Officer or the SAE. The Department of the Army Chief Information Officer is the Director for Information Systems, Command, Control, Communications, and Computers. The Department of the Navy Chief Information Officer is a stand-alone position reporting directly to the Secretary of the Navy, so the Navy SAE retains milestone authority. In the Department of the Air Force, the Air Force Acquisition Executive is also the Air Force Chief Information Officer.

Direct Reporting Program Managers

Some program managers do not report to a PEO, but instead report directly to the CAE. These direct reporting program managers are typically one or two star officers or senior executive service civilian equivalents who manage priority programs of such a nature that direct access to the Component acquisition executive is deemed appropriate. Examples are the Department of the Army's Program Managers for Biological Defense and Chemical Demilitarization and the Department of the Navy's Program Managers for Strategic Systems and the Advanced Amphibious Assault Vehicle.

**Under Secretary of Defense
(Acquisition, Technology and Logistics)**

Title 10, United States Code, §133, authorizes the position of Under Secretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)). The USD(AT&L) serves as both the principal acquisition official within the DoD and the principal acquisition advisor to the Secretary of Defense. The USD(AT&L) serves as the Defense Acquisition Executive, and for acquisition matters, takes precedence over the Secretaries of the military departments. The USD(AT&L) is responsible for establishing acquisition policies and procedures for the Department, and as Chair of the Defense Acquisition Board, makes milestone decisions on ACAT ID programs. The USD(AT&L) also establishes policy for the training and career development of the Defense acquisition workforce.

The Office of the USD(AT&L) has the following three major subordinate staff elements.

- *Principal Deputy USD(AT&L)*: Serves as chief advisor to *USD (AT&L)*, acts in the *USD(AT&L)*'s absence and provides oversight to the following staff activities:
    - Deputy Under Secretary for Industrial Affairs
    - Deputy Under Secretary for Acquisition Reform*
    - Deputy Under Secretary for Installations
    - Deputy Under Secretary for Environmental Security
    - Director, Defense Procurement*
    - Director, Acquisition Resources and Analysis*
    - Director, International Cooperation
    - Director, Interoperability
    - Director, Small and Disadvantaged Business Utilization

- *Director, Defense Research and Engineering*: Principal advisor to the *USD(AT&L)* for scientific and technical matters. Responsible for oversight of DoD science and technology programs, and acquisition programs, and supervises the following subordinate staff elements:

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- Deputy Under Secretary for Advanced Systems and Concepts
- Deputy Under Secretary for Science and Technology
- Director for Strategic and Tactical Systems*
- Director, Defense Advanced Research Projects Agency

- *Deputy Under Secretary of Defense for Logistics and Material Readiness:* Oversees policy for acquisition logistics, readiness, maintenance and transportation, and supervises the following subordinate staff elements:
  - Assistant Deputy Under Secretary for Supply Chain Integration
  - Assistant Deputy Under Secretary for Maintenance Policy
  - Assistant Deputy Under Secretary for Transportation Policy
  - Director, Logistics Architecture Office
  - Director, Systems Modernization
  - Director, Defense Logistics Agency

    * Some of the above officials deal with program managers, PEOs and CAEs on a regular basis, for example:

- *Deputy Under Secretary of Defense for Acquisition Reform:* Responsible for identifying and implementing ways to streamline the acquisition process. Also responsible for the education and training of acquisition personnel.

- *Director, Defense Procurement:* Oversees contracting policy and procedures. Chairs the Defense Acquisition Regulatory Council which issues the Defense Federal Acquisition Regulation Supplement, and represents the USD(AT&L) on the Federal Acquisition Regulatory Council.

- *Director, Acquisition Resources and Analysis:* Oversees the Defense Acquisition Executive Summary and Earned Value Management System processes, provides the executive secretariat for the Defense Acquisition Board, and publishes the DoD 5000 series.

- *Director, Strategic and Tactical Systems:* Responsible for review of ACAT ID weapon systems prior to the Defense Acquisition Board. Chairs the weapon systems overarching integrated product teams that advise the Defense Acquisition Board.

Other officials that report to the USD(AT&L) include:
- Executive Director, Defense Science Board
- Director, Special Programs
- Director, Ballistic Missile Defense Organization
- Director, Defense Logistics Agency

In addition to the above, there are several other offices that play a critical role in Defense acquisition management. These include:

- *Assistant Secretary of Defense (Command, Control, Communications and Intelligence)*: As the chief information officer for DoD, responsible for command, control, communications, computers, intelligence, surveillance and reconnaissance architecture, policies and procedures, serves as the Department's milestone decision authority for ACAT IAM acquisition programs, and establishes acquisition policies for information technology systems.

- *Director, Operational Test and Evaluation*: Responsible for operational and live fire test and evaluation policy and procedures. Analyzes results of operational test and evaluation conducted on ACAT I programs, and other selected programs deemed of a high enough priority to be selected for Defense-level oversight. He reports on results of testing ACAT I programs to the Secretary of Defense, the USD(AT&L), and the Senate and House Committees on Authorizations and Appropriations as to whether test results indicate the system is operationally effective and suitable. This office also renders a live fire test and evaluation report to the Secretary of Defense, the USD(AT&L), and the Senate and House Committees on Authorizations and Appropriations on whether covered systems (primarily ACAT I and ACAT II systems) meet survivability and lethality requirements.

For acquisition related duties and responsibilities pertaining to the *Under Secretary of Defense (Policy), Under Secretary of Defense (Comptroller),* and *Director, Program Analysis and Evaluation,* see Chapter 8.

There are also several boards/councils that are key players in Defense acquisition. These include:

- *Defense Resources Board*: As the DoD's principal resource management organization, the Defense Resources Board plays a major role in the Planning, Programming, and Budgeting System (see Chapter 8). It reviews the service and Defense agency Program Objectives Memoranda and conducts program execution reviews. Chaired by the Deputy Secretary of Defense, key members of this board include the four Under Secretaries of Defense, the Director for Program Analysis and Evaluation, the Director for Defense Research and Engineering, the Secretaries of the military departments, and the Chairman and Vice Chairman of the Joint Chiefs of Staff.

- *Joint Requirements Oversight Council (JROC)*: The JROC validates and approves requirements for ACAT I and IA programs, and leads the Joint Staff in developing policies and procedures for determining operational requirements for all programs. The JROC is chaired by the Vice Chairman of the Joint Chiefs of Staff and includes the following members:
    - Vice Chief of Staff, U.S. Army
    - Vice Chief of Naval Operations
    - Vice Chief of Staff, U.S. Air Force
    - Assistant Commandant, U.S. Marine Corps

In addition to his role as chair of the JROC, the Vice Chairman also serves as Vice Chair of the Defense Acquisition Board and is a member of the Defense Resources Board.

- *Cost Analysis Improvement Group*: This group provides an Independent Cost Estimate of a program's life cycle cost prior to each milestone review of an ACAT ID program. It is also generally responsible for improving cost estimating techniques and practices.

Integrated Product Teams and the Defense Acquisition Board

Integrated Product Teams

The Defense *integrated product team* (IPT) concept was adapted from commercial business to streamline an antiquated, inefficient process. Before integrated product teams, program offices frequently produced a product that, when reviewed at higher levels, was modified substantially or even rejected. These teams are composed of representatives from all appropriate functional disciplines working together to build successful programs thereby enabling decision makers to make the right decisions at the appropriate time. Each IPT operates under the following broad principles:

- Open discussions with no secrets;

- Qualified, empowered team members;

- Consistent, success-oriented, proactive participation;

- Continuous "up-the-line" communications;

- Reasoned disagreement; and

- Issues raised and resolved early.

For ACAT ID and ACAT IAM programs, there are generally two levels of IPTs above the program office — an *Overarching Integrated Product Team* (OIPT) at the Office of the Secretary of Defense, and *Working-Level IPTs* (WIPT) at the headquarters of the military

department. The following paragraphs discuss the roles and responsibilities of these IPTs in the Defense acquisition system.

Overarching Integrated Product Teams: Each ACAT ID program is assigned to an OIPT for management oversight. The primary role of this team is to provide strategic guidance and to help resolve issues early as a program proceeds through its acquisition life cycle. OIPTs for weapons systems are headed by the DoD Director, Strategic and Tactical Systems. OIPTs for C3I systems are headed by the Director, Program Analysis and Integration, office of the Assistant Secretary of Defense (Command, Control, Computers and Intelligence)(OASD (C3I)). Each ACAT IAM program is assigned to an Information Technology OIPT headed by the Director, Performance Assessment, OASD(C3I).

OIPT members include the program manager, the program executive officer, component staff, USD(AT&L) staff, the Joint Staff, and other Defense staff principals, or their representatives, involved in oversight and review of a particular ACAT ID or ACAT IAM program. OIPTs meet as required and convene in formal session two weeks in advance of an anticipated milestone decision to assess information and to provide the status of the program to the milestone decision authority.

Working Level Integrated Product Teams: The WIPTs are formed at the Pentagon-level military department headquarters. They meet as required to help the program manager plan program structure and documentation and resolve issues. The leader of each WIPT is usually the program manager or the program manager's representative. While there is no one-size-fits-all approach, there are three basic tenets to which WIPTs must adhere:

1. The program manager is in charge of the program.

2. Integrated product teams are advisory bodies to the program manager.

3. Direct communication between the program office and all levels in the acquisition oversight and review process is expected as a means of exchanging information and building trust.

The program manager, or designee, may form and lead a type of WIPT called an Integrating IPT (IIPT) composed of a member from each of the other WIPTs. This team supports the development of strategies for acquisition and contracts, cost estimates, evaluation of alternatives, logistics management, cost-performance trade-offs, etc. The IIPT also coordinates the activities of the other WIPTs and ensures that issues not formally addressed by those teams are reviewed.

The following examples of WIPTs are offered as illustrations:

Test Strategy Integrated Product Team: The purpose of this IPT is to assist in outlining the Test and Evaluation Master Plan (TEMP) for a major program. The objective of such an IPT is to reach agreement on the strategy and plan by identifying and resolving issues early, understanding the issues and the rationale for the approach, and, finally, documenting a quality TEMP that is acceptable to all organizational levels the first time.

Cost/Performance Integrated Product Team: The best time to reduce life-cycle costs is early in the acquisition process. Cost reductions must be accomplished through cost/performance tradeoff analyses, conducted before an acquisition approach is finalized. To facilitate that process, each ACAT I and ACAT IA must establish a Cost/Performance IPT (CPIPT). The user community must have representation on this team. Industry representation, consistent with statute and at the appropriate time, must also be considered.

Defense Acquisition Board

The *Defense Acquisition Board* (DAB) is the senior-level Defense forum for advising the USD(AT&L) on critical issues concerning ACAT ID programs. Formal meetings may be held at each milestone to review accomplishments of the previous phase and assess readiness

to proceed into the next phase. The DAB is *issue-oriented.* Typical issues addressed by this board include cost growth, schedule delays, and technical threshold breaches. The result of a DAB review is a go or no-go decision from the USD(AT&L), documented in an Acquisition Decision Memorandum (ADM). Approximately one week prior to a scheduled board review, a DAB Readiness Meeting is held to update the USD(AT&L) on the latest program status and to inform senior acquisition officials of any outstanding issues. If the outstanding issues are resolved at the DAB Readiness Meeting (or if there are no outstanding issues), the USD(AT&L) may decide that a formal review is not required and will issue an acquisition decision memorandum following the readiness meeting. Since the advent of the IPT oversight structure, the majority of ACAT ID programs have not undergone formal DAB reviews.

Defense Acquisition Board members include:

- Under Secretary of Defense (Acquisition, Technology and Logistics), Chairman

- Vice Chairman, Joints Chiefs of Staff, Vice Chairman

- Principal Deputy Under Secretary of Defense (Acquisition & Technology)

- Component Acquisition Executives of the Army, Navy and Air Force

- Under Secretary of Defense (Comptroller)

- Assistant Secretary of Defense (Command, Control, Communications & Intelligence)

- Director, Defense Research and Engineering

- Assistant Secretary of Defense (Strategy and Requirements)

- Director, Program Analysis and Evaluation

- Director, Operational Test and Evaluation

- Defense Acquisition Board Executive Secretary

- Overarching Integrated Product Team Leader

- Program Executive Officer

- Program Manager

Information Technology Overarching Integrated Product Team

The *Information Technology Overarching Integrated Product Team* (IT OIPT) is the Department's senior-level forum for advising the ASD(C3I) on critical decisions concerning ACAT IAM programs. It is chaired by the Director, Performance Assessment who is routinely supported by senior advisors from the Defense staff, the Joint Staff, user representatives, and the cognizant component chief information officer (or CAE, as appropriate).

Component Level Oversight

Each military service and Defense agency has its own oversight and review process which parallels the DAB and IT OIPT processes. These processes are used for managing non-major programs, and for reviewing ACAT ID or ACAT IAM programs prior to a program or milestone review at the Defense level. The following is a summary of the individual military department Pentagon headquarters-level reviews and their respective chair. ACAT III and IV programs are reviewed in a similar fashion by the PEOs or the commander of an acquisition command.

Service Level Review	Chaired By
• Army Systems Acquisition Review Council	• Assistant Secretary of the Army (Acquisition, Logistics and Technology)
• Program Decision Meeting (Navy)	• Assistant Secretary of the Navy (Research, Development and Acquisition)
• Program Decision Meeting (Marine Corps)	• Assistant Secretary of the Navy (Research, Development and Acquisition)
• Air Force Integrated Product Teams/ Acquisition Strategy Panels	• Principal Deputy Assistant Secretary of the Air Force (Acquisition)

6

REQUIREMENTS GENERATION PROCESS

Acquisition programs may be started by studies and analysis defining a warfighting need, by identifying mature technology already available in the federal government or commercial industry, or by a combination of those processes. This chapter focuses on the pre-systems acquisition activity called "user need activities" in DoD Instruction 5000.2. This process includes the study and analysis of mission areas, a mission need analysis to determine if a non-materiel solution is best, an assessment of alternative solutions to meet warfighting deficiencies, and the development of system specific performance requirements. The Chairman of the Joint Chiefs of Staff (CJCS) is responsible for policies and procedures for determining requirements. CJCS Instruction (CJCSI) 3170.01A provides this policy.

Three documents are used in the Department of Defense (DoD) to describe requirements: the Mission Need Statement (MNS), the Capstone Requirements Document (CRD), and the Operational Requirements Document (ORD). The MNS is generated first. It describes a warfighting deficiency, or an opportunity to provide new capabilities, in broad operational, not system specific, terms. The CRD documents overarching system requirements for a broad mission need, such as surveillance or missile Defense, from which may emerge a "system of systems." The ORD translates the MNS and CRD (if applicable) requirements into more detailed and refined performance capabilities and characteristics of the proposed system concept. The ORD also contains Key Performance Parameters (KPPs).

KPPs are performance parameters deemed so critical to the success of the system that failure to attain their minimal values (called the "threshold values") would cast doubt on the desirability/viability of the program. Multiple ORDs may emerge from a single MNS or a CRD.

Determination of Mission Needs

The determination of mission needs is based on mission area analysis (MAA) and mission need analysis (MNA). This is a continuing process of assessing the capabilities of the current force structure (people and materiel) to meet the projected threat, while taking into account opportunities for technological advancement, cost savings, and changes in national policy or doctrine. Mission areas are broad categories of warfighting responsibility, such as fire support for the Army, amphibious warfare for the Marine Corps, air support and interdiction for the Air Force, and strategic sealift/protection for the Navy. MAAs and MNAs are conducted by the Training and Doctrine Command in the Army, the Center for Naval Analysis and/or the Office of the Chief of Naval Operations staff in the Navy, the Marine Corps Combat Developments Command in the Marine Corps, and the operational commands (e.g., Air Combat Command or Air Mobility Command) in the Air Force.

Once identified, deficiencies (i.e., mismatches between current and projected capabilities and the future threat) need to be resolved. First considered are changes in doctrine, tactics, training, organizational structure. These alternatives, often called "nonmateriel alternatives," are investigated first because of their relatively low cost and ease (i.e., speed) of implementation. Should nonmateriel alternatives prove incapable of resolving the deficiency, we are forced to look for materiel solutions. The requirement for a materiel solution is documented in a MNS.

MNSs are written for all mission needs that may result in acquisition programs, regardless of acquisition category, and are prepared in accordance with guidance contained in CJCSI 3170.01A. MNSs are not written for mission needs that can be resolved by nonmateriel
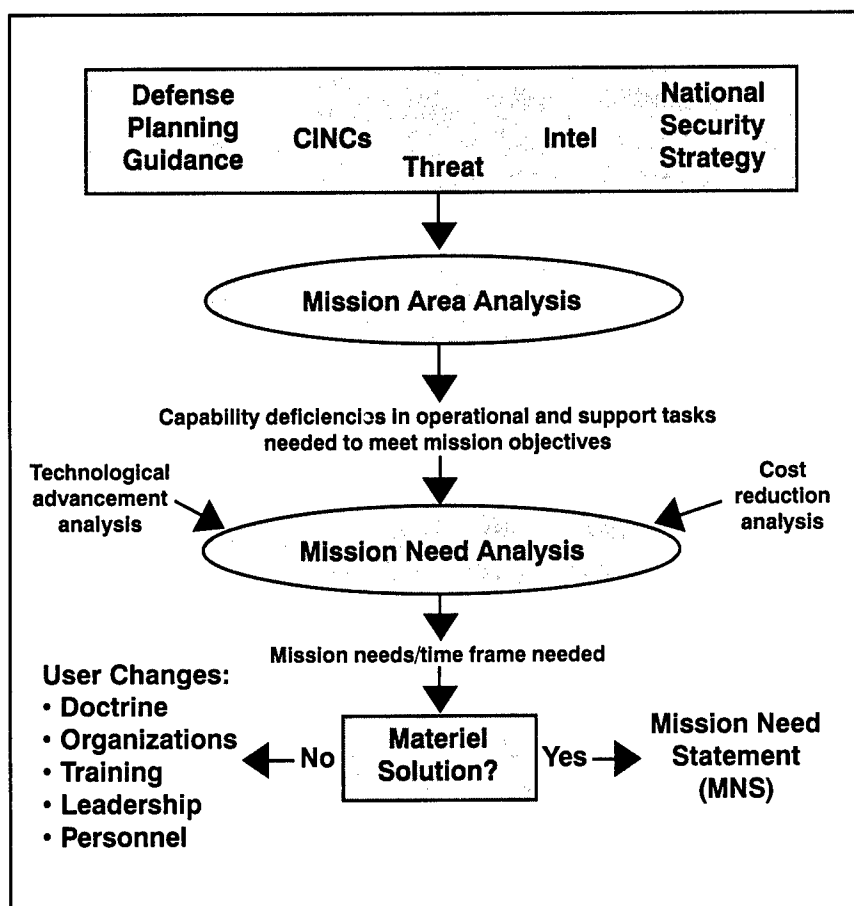
Figure 6-1. Mission Need Determination

solutions. Figure 6-1 illustrates the process for determining mission needs.

Since a MNS describes a warfighting deficiency or technological opportunity, descriptions of specific performance characteristics or specific system solutions are not appropriate. A requirements validation authority reviews, validates, and approves the MNS. Validation confirms that the need exists and cannot be resolved by a nonmateriel solution. Approval represents sanction of the need and certifies it has been subject to the process contained in CJCSI 3170.01A and DoDI 5000.2. The validation authority also determines joint service potential, and then forwards the approved MNS to the appropriate mile-

stone decision authority for a Milestone A review. Disapproved MNS are returned to the originator, who notifies the user.

The Joint Requirements Oversight Council is the validation and approval authority for MNSs with the potential for an ACAT I or ACAT IA program. Once this council validates and approves a MNS it is sent to the Under Secretary of Defense (Acquisition, Technology and Logistics) or the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) for a Milestone A decision. For potential nonmajor programs, the chiefs of the military services, heads of Defense agencies, and commanders-in-chief of unified commands validate and approve their own MNSs. Each MNS that could result in a nonmajor program is sent to the respective Component Acquisition Executive, or Chief Information Officer as appropriate, for a Milestone A decision.

Milestone A: Entry into Concept and Technology Development Phase (Pre-Systems Acquisition)

Pre-systems acquisition is composed of on-going activities in development of user needs, in science and technology, and in concept development work specific to the development of a materiel solution to an identified, validated need. If there are no existing U.S. systems, or other on-hand materiel, to include technology demonstration efforts, that can satisfy the mission need, studies and analysis of selected concepts are undertaken in a *concept exploration* work effort, based on the following hierarchy of materiel alternatives:

- Procurement (including modification) of commercially available systems or equipment, the additional production (including modification) of already-developed U.S. military systems or equipment, or Allied systems or equipment,

- Cooperative development program with one or more Allied nations,

- New joint service development program, or

- New Service-unique development program.

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During Concept Exploration, a study called an *analysis of alternatives* is conducted to gauge the cost and operational effectiveness of possible alternatives to satisfy the mission need as part of the overall *cost as an independent variable* approach. The selection of a preferred alternative based on the analysis of alternatives allows the user to finalize the initial ORD describing operational performance in terms of objectives and minimum acceptable requirements (thresholds) for presentation at the next milestone, usually Milestone B. The ORD will continue to evolve as the initial broad objectives and minimum acceptable requirements become more detailed (in number and specificity) as a result of cost-schedule-performance trade-offs during each subsequent phase of the acquisition life cycle (see Chapter 7).

In the process of refining requirements, the user must adhere to the following key concepts as directed by CJCSI 3170.01A:

- Keep all reasonable options open and facilitate cost, schedule, and performance trades throughout the acquisition process.

- Avoid early commitments to system-specific solutions, including those that inhibit future insertion of new technology and commercial or non-developmental items.

- Define requirements in broad operational capability terms.

- Develop time-phased requirements with associated objectives and thresholds (as appropriate).

- Evaluate how the desired performance requirements could reasonably be modified to facilitate the potential use of commercial or non-developmental items and components.

- Evaluate whether system will be able to survive and operate through the anticipated threat environment.

- Consider critical information needs and intelligence support requirements.

- Address cost in the ORD, in terms of a threshold and objective.

- Include requirements for security, information assuredness, and critical infrastructure protection.

- Consider supportability, data sharing, and interoperability needs of the family of systems in the operational environment.

- Mandate interoperability as a key performance parameter to be documented in all ORDs and CRDs and included in the Acquisition Program Baseline.

Interoperability

Interoperability is the ability of systems, units, or forces to provide data, information, materiel, an services to, and accept services from, other systems, units, or forces, and to use the services so exchanged
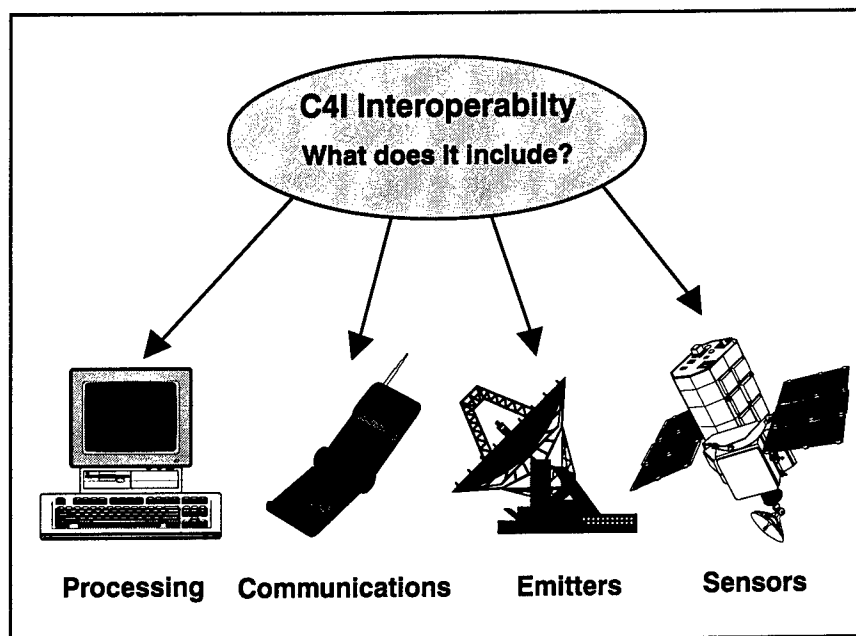

Figure 6-2. Command, Control, Communications, Computers and Intelligence (C4I) Interoperability

to enable them to operate effectively together. All Defense systems must be interoperable with other U.S. and allied defense systems, as defined in the requirements and interoperability documents. The program manager (PM) describes the treatment of interoperability requirements in the acquisition strategy. If the acquisition strategy involves successive blocks satisfying time-phased requirements, this description shall address each block, as well as the transitions from block to block. This description must identify enabling system engineering efforts such as open systems design requirements, data management, and standardization. It must also identify related requirements or constraints (e.g., treaties or international standardization agreements) that impact interoperability requirements.

Consistent with the Department's philosophy of treating new systems as components of a family-of-systems, if enhancements to the PM's program or to other programs is required to support interoperability requirements, the PM must identify the technical, schedule, and funding issues for both the acquisition program and the other program(s). Some examples of interoperability include:

- Aircraft from different Services and allied countries can communicate with each other and with ground forces.

- Aircraft from one Service can exchange target information with a ship of another Service and/or an allied country.

- Ammunition from one Service can be used by weapons from another Service, and/or an allied country.

C4I Interoperability

As shown in Figure 6-2, C4I interoperability issues affect all kinds of systems. When applied to communications-electronics systems or items, interoperability means information can be exchanged directly and satisfactorily between systems and items of equipment.

C4I interoperability policy affects both kinds of Information Technology systems: Automated information systems, i.e., systems that

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normally satisfy business and/or administrative requirements (e.g., the information systems which are used in the Defense Commissary System or by Defense Finance Centers), and C4I systems used in an operational environment to assist the commander in organizing, directing and controlling warfighting forces.

Achievement of seamless interoperability between all Defense C4I systems is of the highest priority. To this end, the DoD published the *Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance Architecture Framework*. This framework establishes the strategic direction for all Defense command, control, communication, computer, intelligence, surveillance and reconnaissance architectures.

Testing of C4I Interoperability Requirements

All C4I systems having joint interoperability requirements, regardless of ACAT, must be tested and certified by the Joint Interoperability Test Command. This testing should be performed during developmental and operational testing whenever possible to conserve resources. The Director, Defense Information Systems Agency certifies as to whether a system meets its interoperability requirements based on results of the testing.

7

ACQUISITION MANAGEMENT FRAMEWORK

Acquisition Life Cycle

The management framework for Defense systems acquisition is commonly referred to as the acquisition life cycle. The generic model for this process is illustrated in Figure 7-1. Program managers tailor/ streamline this model to the maximum extent possible, consistent with technical risk, to provide new systems to the warfighter as fast as possible. The process illustrated in Figure 7-1 provides for multiple
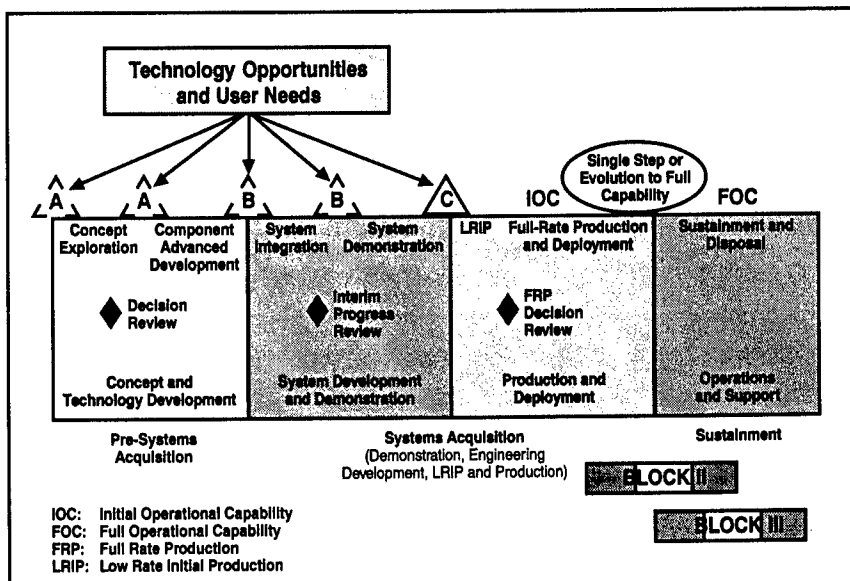
Figure 7-1. Defense Acquisition Management Framework

entry points consistent with a program's technical maturity, validated requirements and funding. Entrance criteria for each phase of the life cycle guide the milestone decision authority in determining the appropriate point for a program to enter the acquisition process.

The life cycle process consists of periods of time called phases, each consisting of two work efforts, separated by decision points called milestones, decision reviews, or interim decision reviews. These decision points provide both the program manager and milestone decision authorities the framework with which to review acquisition programs, monitor and administer progress, identify problems, and make corrections. The milestone decision authority will approve entrance into the appropriate phase of the acquisition process, or passage from one work effort to the next, by signing an acquisition decision memorandum upon completion of a successful review.

The life cycle of a program begins with planning to satisfy a mission need before the program officially begins (see Chapter 6). Program initiation normally occurs at Milestone B. The life cycle process takes the program through research, development, production, deployment, support, upgrade, and finally, demilitarization and disposal. *Initial Operational Capability*, or IOC, is that point at which a selected number of operational forces have received the new system and are capable of conducting and supporting warfighting operations. References to "life cycle costs" in Defense acquisition, include all costs associated with the system, literally from "cradle to grave."

Technological Opportunities and User Needs. The Defense Science and Technology Program identifies and explores technological opportunities within DoD laboratories and research centers, academia, and commercial sources. The aim is to provide the user with revolutionary war-winning capabilities and reduce the risk associated with promising technologies before they are introduced into the acquisition system. Three mechanisms are available to facilitate the transition of innovative concepts and superior technology to the acquisition process: 1) Advanced Technology Demonstrations, 2) Advanced Concept Technology Demonstrations, and 3) Experiments.

Advanced Technology Demonstrators are used to demonstrate technical maturity and the potential for enhanced military capability or cost effectiveness, and are subject to oversight and review at the service or component level. An Advanced Technology Demonstrator can become the basis for a new acquisition program, or for the insertion of new technology into an existing program.

Advanced Concept Technology Demonstrators are used to demonstrate the military utility of a proven technology and to develop the concept of operations for the system to be demonstrated. Consequently, these demonstrators are typically funded and engineered to endure up to two years of service in the field before entering the acquisition process. Oversight and review of Advanced Concept Technology Demonstrators is at the office of the Secretary of Defense and the Joint Staff level.

Experiments, such as the warfighting experiments conducted by the military services and the Joint Forces Command, are used to develop and assess concept-based hypotheses to identify and recommend the best value-added solutions for changes to doctrine, organizational structure, training and education, materiel, leadership, and people required to achieve significant advances in future joint operational capabilities. They are also subject to oversight and review at the military department headquarters, and the office of the Secretary of Defense and Joint Staff.

Following is a brief discussion of each of the phases, work efforts, milestones and other decision reviews. There is no "one size fits all." Each program structure must be based on that program's unique set of requirements and available technology. The process of adjusting the life cycle to fit a particular set of programmatic circumstances is often referred to as "tailoring." The number of phases, work efforts and decision points are tailored by the program manager based on an objective assessment of the program's technical maturity and risks and the urgency of the mission need. Milestone decisions for ACAT ID programs are made by the Under Secretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)) after program review

by the respective Overarching Integrated Product Team and, if applicable, the Defense Acquisition Board. For ACAT IAM programs, the milestone decisions are made by the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) (ASD(C3I)) following a review by the Information Technology Overarching Integrated Product Team.

Milestone A. A successful Milestone A authorizes entry into either Concept Exploration or Component Advanced Development, the two work efforts of the Concept and Technology Development Phase. If an evaluation of multiple concepts is desired, entry into Concept Exploration is appropriate. If the concept is apparent, but more development on key component or subsystem technologies is necessary, then entry into Component Advanced Development is appropriate. A successful Milestone A decision *does not* normally constitute formal program initiation. For ACAT I and ACAT IA programs, the Joint Requirement Oversight Council (see Chapter 6) validates and approves the Mission Need Statement (MNS), and the USD(AT&L) or the ASD(C3I) convenes a Milestone A. Milestone A decisions for potential nonmajor acquisition programs are made by the respective Component Acquisition Executive (CAE). For potential nonmajor automated information system acquisition programs, the Milestone A decision is made by the CAE or Chief Information Officer.

Concept and Technology Development Phase. Entrance criteria for this phase includes a validated and approved MNS, and consideration by the milestone decision authority of technology issues, cooperative development opportunities with allies, and identification of possible alternatives to be studied as directed milestone decision authority. During this phase an initial Operational Requirements Document (ORD) will be developed by the user or user representative (see Chapter 6). Additionally, the program's initial acquisition strategy, cost estimates, acquisition program baseline, test and evaluation master plan, and command, communication, control, computer and intelligence support plan are formulated during this phase. The program manager will also propose exit criteria for the next phase,

usually System Development and Demonstration. A description of the two possible work efforts, and a possible decision review, that comprise this phase follows:

Concept Exploration. Concept Exploration is a work effort that typically consists of competitive, parallel, short-term concept study contracts with private industry. Concept studies may also be solicited from federally funded research and development centers, educational institutions, and non-profit organizations. The focus of these study efforts is to define and evaluate the feasibility of various alternative concepts to satisfy the mission need contained in the MNS. An analysis of alternatives is accomplished to facilitate comparisons between the various competing concepts. Selection of the preferred concept or alternative to take into the next phase, usually System Development and Demonstration, is the key activity of this phase. With approval of the milestone decision authority, the preferred concept is defined in terms of initial, broad objectives for cost, schedule and performance, interoperability, supportability, security, infrastructure within a family of systems (if appropriate), an initial acquisition strategy, and an initial test and evaluation strategy.

Decision Review. During Concept Exploration, the milestone decision authority may hold a Decision Review to determine if Component Advanced Development is necessary to insure key technologies are sufficiently mature to enter development in the next phase. If Component Advanced Development is deemed unnecessary, then a Milestone B or Milestone C may be conducted, thus completing the Concept and Technology Development Phase. If necessary, the Decision Review will direct a Component Advanced Development work effort be conducted for those subsystems or components deemed technologically too immature to enter the next phase, typically System Development and Demonstration.

Component Advanced Development. A program enters this work effort when a concept exists for the needed capability, but the system architecture (i.e., the appropriate set of subsystems to realize the concept in hardware and software) is not complete, or the technology necessary to realize a particular subsystem/component of a system

architecture is considered too immature. A program will leave Component Advanced Development and enter the next phase of work effort when the system architecture has been developed, the component technology has been demonstrated in a relevant environment, and/or the milestone decision authority decides to end the effort, as appropriate.

Milestone B. Milestone B will normally be *program initiation* for Defense acquisition programs. Program initiation depends on three things: a valid requirement (documented in an ORD), maturity of technology, and funding. Prior to making the program initiation decision, the milestone decision authority will confirm that technology is mature enough for systems-level development to begin, an ORD has been approved, and funds are in the budget and the out-year program for all current and future efforts necessary to carry out the acquisition strategy. On rare occasions, program initiation may be appropriate earlier than Milestone B. If so, program initiation will take place upon entry into, or during, Component Advanced Development. A successful Milestone B authorizes entry into either the System Integration or the System Demonstration work efforts of the System Development and Demonstration Phase. There will only be one Milestone B per program, or evolutionary block.

System Development and Demonstration Phase. Entrance criteria for this phase are technology (including software) maturity, validated requirements, and funding. Unless there is some overriding factor, the maturity of the technology will determine the entry point and subsequent path to be followed by the program. Programs entering at Milestone B must have both a system architecture (defined set of subsystems making up the system), and an operational architecture (description of how this system interacts with other systems, to include passing of data). This phase can be entered either directly out of a technology opportunity (i.e., a technology demonstration effort or an experiment) or from the Concept Exploration or Component Advanced Development work efforts. A description of the two work efforts, and a possible interim progress review that comprise this phase follows:

Systems Integration. A program enters System Integration when a system architecture exists, but the component subsystems have not yet been integrated into a complete system. A program may leave System Integration when a prototype of the integrated system has been demonstrated in a relevant environment (e.g., a first flight, or interoperable data flow across system boundaries), the system configuration has been documented, the milestone decision authority determines a factor other than technology justifies forward progress, or the milestone decision authority decides to end the effort. This work effort is guided by the ORD, and may end with an Interim Progress Review authorizing entry into the Systems Demonstration portion of the Systems Development and Demonstration Phase, or a Milestone C decision authorizing entry into the Production and Deployment Phase.

Interim Progress Review. The purpose of the Interim Progress Review is to confirm that the program is progressing as planned within the System Development and Demonstration phase or to adjust the program plan to better accommodate progress to date or changed circumstances. Adjustments to the acquisition strategy must be approved by the milestone decision authority.

Systems Demonstration. A program enters System Demonstration after the system has been demonstrated in prototype articles. This effort ends when engineering development models have been demonstrated in their intended environment and meet the requirements specified in the ORD, or the milestone decision authority decides to end the effort. Engineering development models are usually considered "advanced prototypes" or "fieldable prototypes" that are "production representative," but not built on a production line. Systems Demonstration is followed by Milestone C, authorizing entry into the Production and Deployment Phase.

Milestone C. The purpose of Milestone C is to authorize entry into low-rate initial production for applicable systems, into production or procurement for systems for which low-rate initial production is not applicable, and into limited deployment for software intensive systems with no production components. Milestone C can be reached

directly from pre-systems acquisition (i.e., a technology opportunity or from the Concept and Technology Development Phase), or from Systems Development and Demonstration. A successful Milestone C authorizes entry into the Production and Deployment Phase.

Production and Deployment Phase. Regardless of the program evolution, entrance to the Production and Deployment Phase at Milestone C is dependent upon satisfying the following entrance criteria: Technical maturity (to include an independent technology readiness assessment), system and operational architecture, mature software, demonstrated system integration or commercial products in a relevant environment, and no significant manufacturing risk; an approved ORD; acceptable interoperability; acceptable operational supportability; compliance with the DoD Strategic Plan; and demonstrated affordability and funding. The phase has two work efforts, Low-Rate Initial Production and Full-Rate Production and Deployment, separated by a Full-Rate Production Decision Review:

Low-Rate Initial Production. During low-rate initial production, the contractor produces at least the minimum number of production representative articles for initial operational test and evaluation and live fire testing, to establish an initial production base for the system, and to provide an orderly ramp-up to full-rate production. Low-rate initial production for ACAT I and ACAT II programs is limited to 10 percent of the total production quantity. For nonmajor programs the number of low-rate initial production items is determined by the milestone decision authority using the ACAT I/II limit as a guide. For those programs selected for DoD-level oversight, the number of low rate initial production articles for initial operational test and evaluation and live fire testing must be approved by the DoD Director, Operational Test and Evaluation. (See Chapter 5.)

Full-Rate Production Decision Review. Before granting a favorable Full-Rate Production Decision Review, the milestone decision authority considers initial operational test and evaluation and live fire test and evaluation results (if applicable), demonstrated interoperability, supportability, cost and manpower estimates, and command, control, communications, computer and intelligence

supportability and certification, if applicable. A favorable Full-Rate Production Decision authorizes the program to proceed into the Full-Rate Production and Deployment portion of the Production and Deployment Phase.

Full-Rate Production and Deployment. The system is produced and delivered to the field for operational use. During this phase, the program manager must insure that systems are produced (along with the support infrastructure) at an economical rate and deployed in accordance with the user's requirement to meet the Initial Operational Capability (IOC)[7] specified in the ORD. Follow-on Operational Test and Evaluation may also be conducted, if appropriate, to confirm operational effectiveness and suitability, or verify the correction of deficiencies. Operations and support begins as soon as the first systems are fielded/deployed, therefore, the Production and Deployment Phase overlaps the next phase, Operations and Support.

Operations and Support. During this phase, Full Operational Capability is achieved as specified in the ORD, each element of logistics support is evaluated (e.g., supply and provisioning, maintenance, training, technical data, support equipment), and operational readiness is assessed. Logistics and readiness concerns and issues dominate this phase. Post-fielding supportability and assessment reviews are conducted, as appropriate, to resolve, operational and supportability problems. Especially critical is the approach to long-term supportability for information technology systems or systems with a significant information technology component. Called "Post Deployment Software Support", the program manager must successfully implement the supportability concept to insure system readiness and continued user satisfaction. The supportability concept may rely on a government activity, a commercial vendor, or a combination of both, to provide support over the life of the system. System status is monitored to ensure the system continues to meet the user's needs.

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[7] IOC is the first attainment of the capability to employ effectively a weapon, item of equipment, or system by an adequately trained, equipped and supported military unit or force.

Product improvement programs or service life extension programs, may be initiated as a result of experience with the systems in the field. During deployment and throughout operational support, the potential for modifications to the fielded system continues. Modifications that are of sufficient cost and complexity to qualify as ACAT I or ACAT IA programs are considered as separate acquisition efforts for management purposes. Modifications that do not cross the ACAT I or ACAT IA threshold are considered part of the program being modified.

Disposal of the system occurs at the end of its useful life. The program manager should have planned for disposal early in the system's life cycle, and ensured that system disposal minimizes DoD's liability due to environmental, safety, security, and health issues. Environmental considerations are particularly critical during disposal as there may be international treaty, or other legal considerations, requiring intensive management of the system's demilitarization and disposal.

Acquisition Strategy Considerations in Executing the Life Cycle Model

The acquisition strategy must define what approach will be followed to achieve Full Operational Capability. There are two approaches: single step to full capability and evolutionary acquisition. The approach to be followed depends on the availability of time-phased requirements in the Operational Requirements Document, maturity of technologies, cost analyses, supportability considerations, and training. For both single step and evolutionary approaches, software development and integration will follow a spiral development process. Spiral development follows an iterative development process in which continually expanding software versions are released based on learning from earlier development activity and user experience from earlier deployments.

Evolutionary Acquisition. Evolutionary acquisition strategies are the preferred approach to satisfying operational needs. Evolutionary acquisition strategies define, develop, test and produce/deploy an

initial core militarily useful capability, called "Block 1," then provide for additional increments of upgraded capability over time ("Block 2," "Block 3," etc.) until full capability is finally achieved. There are two approaches to subsequent block upgrades: 1) The Operational Requirements Document includes a firm definition of full capability, as well as a firm definition of requirements to be satisfied by each block, to include an Initial Operating Capability for each block. The acquisition strategy defines how each block will be funded, developed, tested, produced, fielded, and operationally supported, and 2) The ORD includes a firm definition of the first block, but does not initially allocate to specific subsequent blocks the remaining requirements that must be met to achieve full capability. In this option, requirements for subsequent blocks, will be defined in the ORD based on the warfighters increased understanding of the delivered capability, evolving threat and available technology, "lead time away" from beginning work on that particular block. (Lead time must be sufficient to enter the Planning, Programming, and Budgeting System (see Chapter 8), and to plan for the design, development and test of the capability allocated against the block.)

In executing the evolutionary approach, the program manager must balance the need to meet evolving requirements with the ability of the warfighter and the support structure to absorb continued training and deployments of new blocks, and possible retrofitting of blocks already fielded.

Key Activities

All acquisition programs, regardless of acquisition category (ACAT), must accomplish certain key activities. These activities generate information that structures and defines the program, and facilitates planning and control by the program manager and oversight by a milestone decision authority. The information generated by key activities may be contained in stand-alone documents, or may be structured in accordance with the desires of the milestone decision authority. Most of this information/documentation is carefully constructed by the program manager using integrated product teams.

Key activities include requirements determination, selection of a preferred alternative, cost estimating, formulation of an strategy acquisition and program structure, contract planning and management, budget execution, formulation of an acquisition program baseline, test planning, interoperability planning, the proposal of exit criteria to the milestone decision authority, and technical management.

A brief description of each key activity folows:

Requirements determination. The program must address the mission need documented in the MNS, and meet the system peculiar performance documented in the ORD (see Chapter 6).

Selection of a preferred alternative. Alternatives which could potentially meet the mission need are analyzed as part of the cost as an independent variable (CAIV) process (see Chapter 2) for establishing requirements in the context of cost-performance trades. For an ACAT I program this process can be quite formal, requiring significant time, effort and dollars. The analysis supporting a preferred alternative is usually contained in a study called an *Analysis of Alternatives*, but the detail and formality of this study is at the discretion of the milestone decision authority.

Cost estimating. In addition to the cost performance trades accomplished by the CAIV process, detailed life cycle cost estimating must be accomplished to support inputs into the Program Objectives Memorandum (see Chapter 8), and the budget. Cost estimating is done at the program level (called the *Program Office Estimate*), the Component headquarters level (called a *Component Cost Analysis*), and at the Defense staff level (called an *Independent Cost Estimate*), as appropriate to the ACAT of the program. (See Chapter 4.) Additionally, cost estimating supports *affordability assessments* which determine whether a Component can "fit" a program within its projected budget authority (over time) given all of the Component's other commitments.

Preparation of an acquisition strategy and program structure. The *Acquisition Strategy*, developed by the program manager and approved by the milestone decision authority, is a comprehensive, overarching master plan which details how the program's goals and objectives will be met, and serves as a "roadmap" for program execution from program initiation through post-production support. It describes the key elements of the program (e.g., requirements, resources, testing, contracting approach, and open systems design) and their interrelationship, and evolves over time becoming increasingly definitive as the program matures. Acquisition strategies are tailored to the specific needs of an individual program. Program structure charts are schedules that graphically depict the time phasing of key events in the acquisition strategy, like milestones, testing, and others.

Contract planning and management. Contracting for goods and services is fundamental since the functions inherent in systems acquisition such as analysis, design, development, test, production, sustainment, modification and disposal of systems are accomplished through contracts with private industry. Typical activities include preparing an *Acquisition Plan* (a description of contracting strategy for the program with emphasis on the types and numbers of contracts to be awarded in an upcoming phase), preparing the *Request for Proposal* (a document which describes the task(s) or service(s) that the government wants industry to propose against), conducting a source selection (a process to select the winning contractor(s)), and performing contractor surveillance and monitoring contract performance.

Budget execution. Resources must be budgeted and obtained to execute contracts with industry. This includes formulating input for the *Program Objectives Memorandum* (a spend plan covering a 5 or 6 year period), the budget, and other programmatic or financial documentation in support of the Planning, Programming, and Budgeting System. Funds are "obligated" upon the signing of a contact; funds are "outlayed" as the government makes actual payment in accordance with the contract for goods and services rendered.

Preparation of an Acquisition Program Baseline (APB). The baseline contains the most important cost, schedule and performance parameters, described in terms of threshold and objective values. A threshold value is a required value while an objective value is a desired value. Schedule parameters include key schedule events, such as milestone reviews, initiation of key testing, and the start of production. APB performance parameters are the Key Performance Parameters specified in the ORD (see Chapter 6). Thus, the APB is a convenient summary of the most important aspects of a program (cost, schedule and performance), and provides a useful tool for management to assess how well a program is progressing towards its stated objectives. The APB is developed by the program manager and approved by the chain of authority up to the milestone decision authority. For example, the APB for an ACAT ID program will be approved by its Program Executive Officer, the Component Acquisition Executive and Defense Acquisition Executive.

Test planning. Test planning is central to the formulation of a coherent acquisition strategy. There is a variety of testing that must be planned and accomplished either to confirm program progress, or to conform to statutory dictate. After all, it is by testing that we validate the performance requirements identified in the ORD by the user and promised in the acquisition program baseline by the program manager. Testing includes developmental test and evaluation, operational test and evaluation, and live fire test and evaluation, as appropriate. The program manager's *Test and Evaluation Master Plan* documents the overall structure and objectives of the test and evaluation program. It provides a framework to generate detailed test and evaluation plans for a particular test, and contains resource and schedule implications for the test and evaluation program.

Interoperability planning. Interoperability within and across the military services and partners in coalition warfare is a essential for successful combat operations. To facilitate planning and ensure interoperability policy is being considered and addressed, a *Command, Control, Communications, Computers and Intelligence Support Plan (C4ISP)* is required for all weapon systems/programs that interface

with command, communication, control, computer and intelligence systems. The C4ISP includes system description, employment concept, operational support requirements, and interoperability and connectivity requirements. It also contains an evaluation of the intelligence support for targeting requirements required by the program.

Formulation of exit criteria. Milestone decision authorities use *exit criteria* to establish goals for an acquisition program during a particular phase. At each milestone review, the program manager proposes exit criteria appropriate to the next phase of the program for approval by the milestone decision authority. Exit criteria are phase specific tasks selected to track progress in important technical, schedule or risk management areas. They act as "gates," which when successfully passed, demonstrate that the program is on track to achieve its final goals. Examples of appropriate exit criteria are achieving a level of performance (e.g., engine thrust, or missile range), or successful accomplishment of a task (e.g., first flight). Exit criteria are documented in the Acquisition Decision Memorandum issued by the milestone decision authority upon completion of a milestone review.

Technical management. This is a broad term including the management of a totally integrated effort of system engineering, test and evaluation, production, and logistics support over the system life cycle. Its goal is timely deployment of an effective system, sustaining it, and satisfying the need at an affordable cost. Technical management involves balancing a system's cost, schedule, and performance. Cost includes all funds required to design, develop, produce, operate, support, and dispose of a system. Schedule includes the time it takes to design, develop, produce, and deploy a fully supported system. Performance is the degree to which a system can be expected to perform its mission in combat. Technical management includes defining the system, conducting design engineering, performing systems engineering (system cost, schedule, and performance trade-offs), developing/acquiring computer resources (including software), planning for logistics support, identifying and tracking reliability, availability, and maintainability requirements, transitioning from development

to production, configuration management, ensuring producibility of the final design, defining manufacturing processes and controls, and planning for disposal at the end of useful life.

8

RESOURCE
ALLOCATION
PROCESS

All resources (dollars) for Department of Defense (DoD) activities, whether for weapons, information systems, people, buildings, or operating and support costs, are provided through the resource allocation process. The four phases of this process are:

- Phase 1 – Planning, Programming, and Budgeting System

- Phase 2 – Enactment

- Phase 3 – Apportionment

- Phase 4 – Execution

From the standpoint of developing, producing, fielding, and supporting weapon systems, the PPBS is the focus of attention in the headquarters activities, while Defense acquisition program managers are equally concerned with providing information to ensure their programs are funded for the future, and with the day-to-day management of their program. Following is a brief discussion of these four phases, which are depicted in Figure 8-1.

Phase I – Planning, Programming, and Budgeting System (PPBS)

PPBS is the process that produces DoD's portion of the President's Budget. It was originally introduced by Secretary of Defense Robert
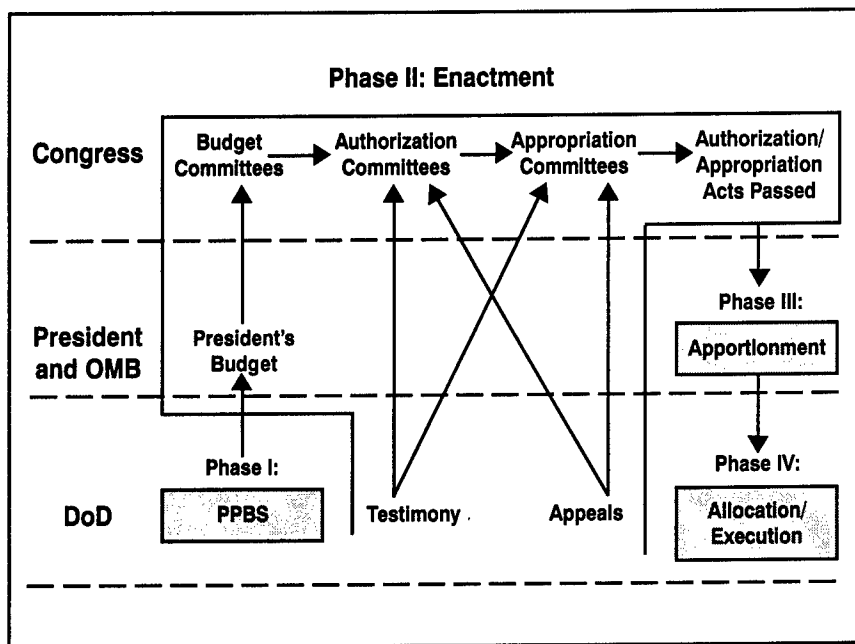
Phase II: Enactment

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Congress    Budget ──────► Authorization ──────► Appropriation ──────► Authorization/
            Committees     Committees            Committees            Appropriation
                                                                       Acts Passed
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Phase III:

President   President's   Apportionment
and OMB   Budget

                                                              Phase IV:

Phase I:

DoD   PPBS   Testimony   Appeals   Allocation/
                                                              Execution

Figure 8-1. Resource Allocation Process

McNamara in 1962, and is unique to the DoD. It is a 14-16 month cyclic process with three distinct but interrelated phases, planning, programming, and budgeting. These phases provide a formal, systematic structure for making decisions on policy, strategy, and the development of forces and capabilities to accomplish anticipated missions. The objective of PPBS is to provide operational commanders with the best mix of forces and support in view of real fiscal constraints.

The Deputy Secretary of Defense manages the PPBS with the advice and assistance of the Defense Resources Board, which he chairs. The Defense Resources Board includes the four Under Secretaries of Defense (i.e., for Acquisition, Technology and Logistics; Policy; Comptroller; and Personnel and Readiness), the Director, Program Analysis and Evaluation, the Chairman and Vice Chairman of the Joint Chiefs of Staff (JCS), and the Secretaries of the Army, Navy and Air Force.

A brief description of each segment of the PPBS follows:

Planning. This phase is the responsibility of the Under Secretary of Defense (Policy). Planning starts in the fall (around October) and ends in the spring (March) with publication of *Defense Planning Guidance.*

Programming. This phase is managed by the Director, Program Analysis and Evaluation. It is the bridge between planning (with broad fiscal guidance) and budgeting (which meticulously prices each program element). It begins when draft Defense Planning Guidance come out early in the year and ends with the submission of the Military Departments and Defense agency Program Objectives Memoranda (POMs) in early summer (May-June). POMs, are based on Defense Planning Guidance, are requests for resources to accomplish assigned missions.

Budgeting. The Under Secretary of Defense (Comptroller) is responsible for this phase. After the Defense staff reviews the POMs, budget estimates are prepared and forwarded (in September) to the Under Secretary of Defense (Comptroller). Military Department and Defense agency budget estimates are reviewed by the Defense staff, and the final DoD budget then goes to the White House Office of Management and Budget to become part of the President's budget submission to Congress in February, thus ending the budgeting phase.

The following table summarizes the responsible agency and key product of each PPBS segment.

Segment	DoD Action Agency	Product
Planning	Under Secretary of Defense (Policy)	Defense Planning Guidance
Programming	Director, Program Analysis & Evaluation	Approved Program Objectives Memorandum
Budgeting	Under Secretary of Defense (Comptroller)	DoD portion of the President's Budget

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Phase II – Enactment

Enactment is the process through which the Congress reviews the President's Budget, conducts hearings, and passes legislation. Enactment begins when the President submits the annual budget to Congress in early February of each year and ends when the President signs the annual authorization and appropriation bills approximately nine months later. "Authorization" approves programs and specifies maximum funding levels and quantities of systems to be procured. The "appropriations process" provides the budget authority with which to incur obligations (i.e., obligate) and expend and outlay funds.

Phase III – Apportionment

Once the authorization and appropriations legislation is signed into law by the President, funds are made available for DoD and other federal agencies. "Apportionment" occurs when the Office of Management and Budget provides these funds to DoD and other federal agencies. Subsequently, DoD allocates funds within the Department through action by the Under Secretary of Defense (Comptroller) and his counterpart in the services and Defense agencies.

Phase IV – Execution

The execution phase occurs when appropriated funds are spent on Defense programs. In other words, it is the process of "obligating" funds (awarding contracts) and "expending" funds (writing checks to pay bills). Outlays occur when government checks are cashed and money flows out of the U.S. Treasury. The four phases of the resource allocation process overlap (see Figure 8-2).

The current fiscal year budget is being executed while enactment of next year's is underway, and programming for the following budget is in process. Planning is essentially a continuous process.

Beginning in 1986 with submission of the first two-year Defense budget (for fiscal years 1988-89), PPBS became a nominal biennial
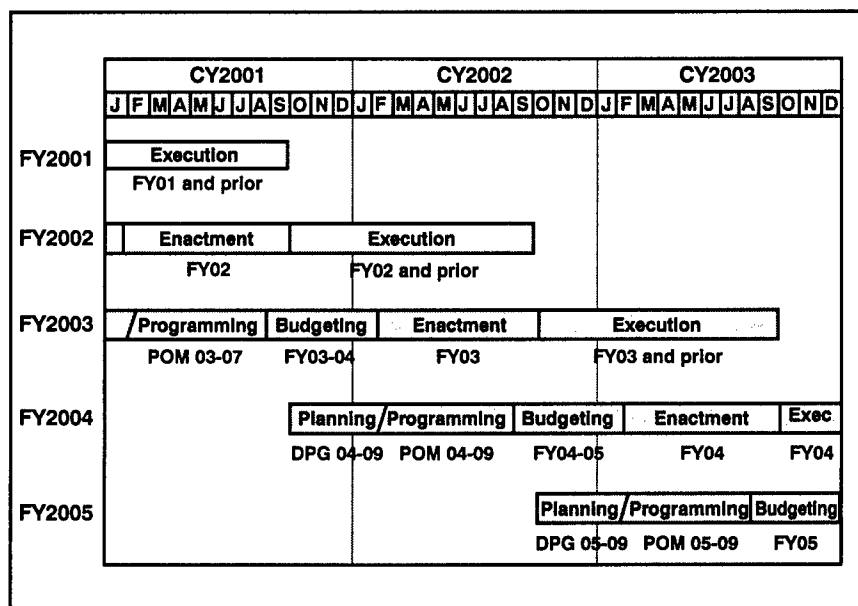
CY2001 | J F M A M J J A S O N D

CY2002 | J F M A M J J A S O N D

CY2003 | J F M A M J J A S O N D

FY2001 — Execution | FY01 and prior

FY2002 — Enactment (FY02) | Execution (FY02 and prior)

FY2003 — Programming (POM 03-07) | Budgeting (FY03-04) | Enactment (FY03) | Execution (FY03 and prior)

FY2004 — Planning/Programming (DPG 04-09 POM 04-09) | Budgeting (FY04-05) | Enactment (FY04) | Exec (FY04)

FY2005 — Planning/Programming (DPG 05-09 POM 05-09) | Budgeting (FY05)

Figure 8-2. Resource Allocation Process (RAP) – Overlap

process. Even though DoD has complied with biennial budgeting since January 1987, Congress authorizes most programs and funding on an annual basis and appropriates funds on an annual basis. There are a few exceptions. The most notable are programs for which multiyear (rather than annual) procurements have been authorized. However, even multiyear procurements must be funded by annual appropriations. PPBS also results in periodic updates to the Future Years Defense Program, reflecting requirements for the out-years (years beyond the next budget year) based on DoD planning to meet national Defense objectives.

It is incumbent on program managers and other officials responsible for any aspect of the resource allocation process to be aware of the sequence of activities and to understand where they are at all times. Note that the PPBS is a calendar driven system and that the acquisition life cycle is event driven. Avoiding a mismatch or disconnect between programmatic requirements and available funding demands close attention on the part of program managers. This may be the

most challenging part of a program manager's job, and if not managed carefully can become the greatest single source of program instability.

INTERNET
WORLD WIDE WEB
LOCATIONS

For readers who wish to follow-up with additional study on the Defense acquisition system, the following list of WWW locations for the major organizations and documents mentioned in this pamphlet may be helpful. (Addresses are current as of the publication date of this pamphlet).

Organization/Document	WWW Location
Acquisition Deskbook	http://www.deskbook.osd.mil
Acquisition Reform	http://www.acq.osd.mil/ar
Assistant Secretary of the Army (Acquisition, Logistics and Technology), the Army Acquisition Executive	http://www.sarda.army.mil
Assistant Secretary of the Air Force (Acquisition), the Air Force Acquisition Executive	http://www.safaq.hq.af.mil
Assistant Secretary of the Navy (Research, Development and Acquisition), the Navy and Marine Corps Acquisition Executive	http://www.hq.navy.mil/RDA
Assistant Secretary of Defense (C3I), the DoD Chief Information Officer	http://www.c3i.osd.mil
Advanced Concept Technology	http://www.acq.osd.mil/at
Chairman, Joint Chiefs of Staff (CJCS)	http://dtic.mil/jcs
CJCS Instruction 3170.01A, Requirements Generation	http://www.dtic.mil/doctrine/jel/ cjcsd/cjcsi

Organization/Document	WWW Location
Director, Program Analysis & Evaluation	http://www.pae.osd.mil
Director, Operational Test & Evaluation	http://www.dote.osd.mil
DoDD 5000.1, DoDI 5000.2, and DoD 5000.2-R	http://www.acq.osd.mil/ara
Federal Acquisition Regulation (FAR)	http://www.ARNet.gov/far/
Defense FAR Supplement (DFARS)	http://farsite.hill.af.mil/Vfdfar1.htm
Integrated Product and Process Development, and Integrated Product Teams (IPPD and IPT)	http://www.acq.osd.mil/io/se/ippd/ippd_pubs.html
Joint Technical Architecture (JTA)	http://www-jta.itsi.disa.mil
Joint Vision 2020	http://www.dtic.mil/jv2020
Title 10 (Armed Forces) United States Code	http://www4.law.cornell.edu/uscode/10/
Office of the Secretary of Defense	http://defenselink.mil
Under Secretary of Defense (Acquisition, Technology and Logistics)	http://acq.osd.mil/

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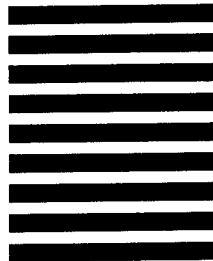**BUSINESS REPLY MAIL**

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REPORT DOCUMENTATION PAGE

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, D.C. 20503.

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE November 2000	3. REPORT TYPE AND DATES COVERED Handbook

4. TITLE AND SUBTITLE Introduction to Defense Acquisition Management	5. FUNDING NUMBERS

6. AUTHOR(S)
Gary J. Hagan
Charles B. Cochrane

7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(ES) Defense Acquisition University 9820 Belvoir Road Suite 3, ATTN: FD-AP Fort Belvoir, VA 22060-5565	8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESSES(ES) Same as 7.	10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT "A" Distribution for Public Release; Distribution unlimited.	12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This handbook is the fifth edition published by the Defense Acquisition University. Although the general format of the second edition has been retained, this version has been significantly revised to reflect the latest (October 2000) acquisition management policies and procedures, the Department of Defense (DoD) 5000 Documents.

This handbook is designed to be a quick study guide to refresh the skilled and experienced acquisition management professional; as well as a comprehensive introduction to the world of systems acquisition management for the newcomer. It focuses on Department of Defense-wide applications rather than on the details of how specific weapons (or Automated Information System (AIS)) programs are managed.

14. SUBJECT TERMS Introduction to Defense Acquisition Management, Acquisition Reform, DoD Acquisition Policy, Defense Acquisition Management Organizations, Acquisition Management (Life Cycle) Process	15. NUMBER OF PAGES 78
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unlimited